

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2003-111170**

(43)Date of publication of application : **11.04.2003**

(51)Int.Cl.

H04Q 9/00

G06F 13/00

G06F 15/00

H04M 11/00

(21)Application number : **2001-298259**

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(22)Date of filing : **27.09.2001**

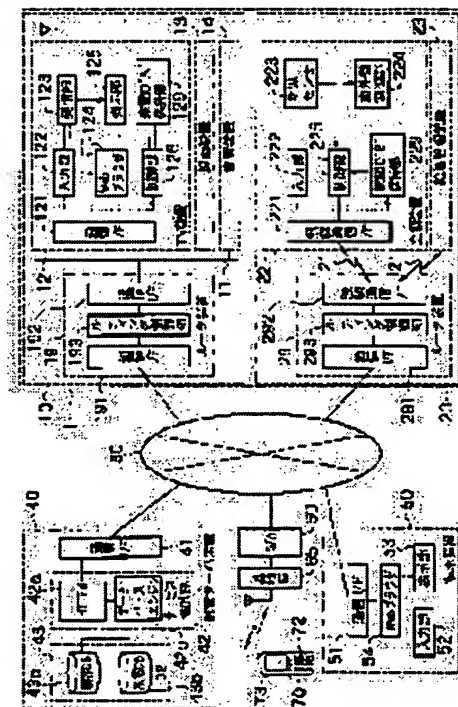
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## (54) DOMESTIC APPLIANCE, SERVER SYSTEM FOR DOMESTIC APPLIANCE, AND REPEATING DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To readily achieve remote control of domestic appliances of which the set-up environments are varied.

**SOLUTION:** When a user demands services by operating a Web browser 124 of a TV device 12, the demand for services including an ID of a domestic appliance (air conditioner 22) from which the services are to be taken is supplied to a domestic appliance server system 40 through a router 19 and a network 30. In response to the demand, an HTTPd 42a of the server system 40 supplies a control program for taking the demanded services to the domestic appliance (air conditioner 22) corresponding to the domestic appliance ID.



### LEGAL STATUS

[Date of request for examination] 14.02.2003

[Date of sending the examiner's decision of rejection] 02.11.2004

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection] 2004-24729

[Date of requesting appeal against examiner's decision of rejection] 02.12.2004

[Date of extinction of right]

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**CLAIMS**

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**[Claim(s)]**

**[Claim 1]** It is the household-electric-appliances device which applies for use of service to the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that there might be no duplication between the household-electric-appliances devices which belong to two or more categories and can perform said household-electric-appliances server equipment and communication link, The means of communications which performs a communication link with said household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-electric-appliances device It holds for every owner. Offer of service to every owner. The household-electric-appliances device characterized by having a service request means to transmit the offer demand of service to the household-electric-appliances device (2nd household-electric-appliances device) of the identification information of the household-electric-appliances device (1st household-electric-appliances device) concerned, and the owner of the household-electric-appliances device concerned to the household-electric-appliances server equipment to manage.

**[Claim 2]** An acknowledgment indicator means to display the image according to the data about said 2nd household-electric-appliances device by which said service request means is supplied from said household-electric-appliances server equipment to the identification information of said 1st household-electric-appliances device, or the offer demand of service, When there is a check input from the user according to the display by this acknowledgment indicator means, starting of the service use software beforehand built into said 2nd household-electric-appliances device by service use software or the household-electric-appliances device concerned in the confirmed information which shows a purport with a check input according to the confirmed information concerned The household-electric-appliances device according to claim 1 characterized by having a check transmitting means to transmit to said server equipment which transmits the command to direct.

**[Claim 3]** Said service request means receives the user supplied from said household-electric-appliances server equipment according to the identification information of said 1st household-electric-appliances device, or the offer demand of said service. The directions display means on which the image according to the power-source input about the 2nd household-electric-appliances device or directions of network connection is displayed, When there is a completion input from the user according to the display by this directions display means, a completion transmitting means to transmit to said server equipment which starts offer of service of as opposed to said 2nd household-electric-appliances device for the completion information which shows a purport with a completion input according to the completion information concerned The household-electric-appliances device according to claim 1 characterized by having.

**[Claim 4]** It is a household-electric-appliances device using the service offered from the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that there might be no duplication between the household-electric-appliances devices which belong to two or more categories and can perform said household-electric-appliances server equipment and communication link, The means of communications which performs a communication link with said household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-

electric-appliances device It holds for every owner. Offer of service to every owner The household-electric-appliances server equipment to manage a service request Starting of the service use software beforehand built into the service use software transmitted according to the offer demand of service to the identification information of this household-electric-appliances device that the household-electric-appliances device (1st household-electric-appliances device) to transmit transmitted, and the household-electric-appliances device (2nd household-electric-appliances device) concerned, or the household-electric-appliances device concerned A receiving means to receive the command to direct through said means of communications, The household-electric-appliances device characterized by having a service use means to perform the service use software concerned according to said received service use software or command, and to receive offer of the service from said household-electric-appliances server.

[Claim 5] Said 1st household-electric-appliances device and said 2nd household-electric-appliances device are a household-electric-appliances device according to claim 1 or 4 characterized by connecting with a respectively different in-house network.

[Claim 6] The in-house network to which said 1st household-electric-appliances device is connected, and the in-house network to which said 2nd household-electric-appliances device is connected are a household-electric-appliances device according to claim 5 characterized by connecting with said public network through different router equipment which performs junction with said public network respectively.

[Claim 7] To said 1st household-electric-appliances device and the 2nd household-electric-appliances device The address (global address) of a proper is assigned for every device connected to said public network. It is the household-electric-appliances device according to claim 1 or 4 by which the packet from said household-electric-appliances server equipment is characterized by direct attainment being directly possible to the 2nd household-electric-appliances device, making said household-electric-appliances server equipment correspond to the identification information of said household-electric-appliances device, and holding said address or name through a public network.

[Claim 8] The effective address (local address) is assigned only within said in-house network to which the 2nd household-electric-appliances device is connected. said 2nd household-electric-appliances device — this — said household-electric-appliances server equipment The information which shows the purport to which it is made to correspond to the identification information of said household-electric-appliances device, and said local address is assigned is held. The communication link between said 2nd household-electric-appliances device and said household-electric-appliances server equipment said 2nd household-electric-appliances device — this — between said in-house network to which the 2nd household-electric-appliances device is connected, and said public network The household-electric-appliances device according to claim 1 or 4 characterized by carrying out by acting as intermediary according to the information with which transmit the junction demand which has the information which shows the address or the address of said household-electric-appliances server equipment to the established junction means, and this repeating installation indicates the address or the address under junction demand to be.

[Claim 9] The address (private address) which cannot reach from said public network side is assigned to said 2nd household-electric-appliances device. The communication link between said 2nd household-electric-appliances device and said household-electric-appliances server equipment said 2nd household-electric-appliances device — this — between the 2nd household-electric-appliances device and said household-electric-appliances server equipment The household-electric-appliances device according to claim 1 or 4 characterized by carrying out by acting as intermediary according to the information with which transmit the junction demand which has the information which shows the address or the address of said household-electric-appliances server equipment to the established junction means, and this repeating installation indicates the address or the address under junction demand to be.

[Claim 10] It is the household-electric-appliances device according to claim 8 or 9 characterized by performing the communication link to the 2nd household-electric-appliances device from said household-electric-appliances server equipment as a response to the transmission to said household-electric-appliances server equipment from said 2nd household-electric-appliances device for every predetermined time.

[Claim 11] The household-electric-appliances device according to claim 7 to 9 characterized by using a HTTP

(Hyper Text Transfer Protocol) protocol as a protocol of the communication link between said 2nd household-electric-appliances device and said household-electric-appliances server equipment.

[Claim 12] It is household-electric-appliances server equipment which offers the service to a household-electric-appliances device through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that there might be no duplication between the household-electric-appliances devices which belong to two or more categories and can perform household-electric-appliances server equipment and a communication link concerned for every owner, The identification information concerned of the 1st household-electric-appliances device transmitted from said household-electric-appliances device (1st household-electric-appliances device) which requires use of service, A receiving means to receive the use demand of service including the information which shows the household-electric-appliances device (2nd household-electric-appliances device) using service, A check means to check whether the household-electric-appliances device corresponding to the information the owner corresponding to said said identification information of the 1st household-electric-appliances device which received indicates said 2nd household-electric-appliances device which received to be is owned with reference to said identification information maintenance means, When it is checked that the owner corresponding to the use demand of said service in this check means owns said 2nd household-electric-appliances device, starting of the service use software beforehand built into said addressing to a household-electric-appliances device of the 2nd by service use software or the household-electric-appliances device concerned Household-electric-appliances server equipment characterized by having a transmitting means to transmit the command to direct.

[Claim 13] Household-electric-appliances server equipment according to claim 12 characterized by having a device data-hold means to hold the data about said 2nd household-electric-appliances device, and an equipment-data transmitting means to transmit the data in which said 2nd household-electric-appliances device is shown according to the use demand of the service which said receiving means received to said 1st household-electric-appliances device.

[Claim 14] Household-electric-appliances server equipment according to claim 12 characterized by to have the service provision control means which starts offer of the service to said 2nd household-electric-appliances device when the completion information according to a directions transmitting means to transmit the directions to a user to said 1st household-electric-appliances device, and the directions to the user who this transmitted is received from said 1st household-electric-appliances device according to the offer demand of said service.

[Claim 15] Said 1st household-electric-appliances device and said 2nd household-electric-appliances device are household-electric-appliances server equipment according to claim 12 characterized by connecting with a respectively different in-house network.

[Claim 16] The in-house network to which said 1st household-electric-appliances device is connected, and the in-house network to which said 2nd household-electric-appliances device is connected are household-electric-appliances server equipment according to claim 15 characterized by connecting with said public network through different router equipment which performs junction with said public network respectively.

[Claim 17] To said 1st household-electric-appliances device and the 2nd household-electric-appliances device The address (global address) of a proper is assigned for every device connected to said public network. It is household-electric-appliances server equipment according to claim 12 with which the packet from the household-electric-appliances server equipment concerned is characterized by direct attainment being directly possible to the 2nd household-electric-appliances device, making said identification information maintenance means correspond to the identification information of said household-electric-appliances device, and holding said address through said public network.

[Claim 18] The effective address (local address) is assigned only within said in-house network to which the 2nd household-electric-appliances device is connected. said 2nd household-electric-appliances device -- this -- The information which shows the purport to which said identification information maintenance means is made to correspond to the identification information of said household-electric-appliances device, and said local address is assigned is held. The communication link between said 2nd household-electric-appliances device and the household-electric-appliances server equipment concerned said 2nd household-electric-appliances device -- this -- between said in-house network to which the 2nd household-electric-appliances device is connected, and said

public network Household-electric-appliances server equipment according to claim 12 characterized by carrying out by acting as intermediary according to the information with which transmit the junction demand which has the information which shows the address or the address of the household-electric-appliances server equipment concerned to the established junction means, and this repeating installation indicates the address or the address under junction demand to be.

[Claim 19] The address (private address) which cannot reach from said public network side is assigned to said 2nd household-electric-appliances device. The communication link between said 2nd household-electric-appliances device and the household-electric-appliances server equipment concerned said 2nd household-electric-appliances device — this — between the 2nd household-electric-appliances device and the household-electric-appliances server equipment concerned Household-electric-appliances server equipment according to claim 12 characterized by carrying out by acting as intermediary according to the information with which transmit the junction demand which has the information which shows the address or the address of said household-electric-appliances server equipment to the established junction means, and this repeating installation indicates the address or the address under junction demand to be.

[Claim 20] It is household-electric-appliances server equipment according to claim 18 or 19 characterized by performing the communication link to the 2nd household-electric-appliances device from said household-electric-appliances server equipment as a response to the transmission to the household-electric-appliances server equipment concerned from said 2nd household-electric-appliances device for every predetermined time.

[Claim 21] Household-electric-appliances server equipment according to claim 17 to 19 characterized by using a HTTP (Hyper Text Transfer Protocol) protocol as a protocol of the communication link between said 2nd household-electric-appliances device and the household-electric-appliances server equipment concerned.

[Claim 22] They are the in-house network to which the household-electric-appliances device using the service which the household-electric-appliances server equipment connected via the public network offers was connected, and the repeating installation installed between said household-electric-appliances server equipment. The effective address (local address) is assigned to said household-electric-appliances device only within said in-house network. A receiving means to receive the junction demand which has the information which shows the address or the address of said household-electric-appliances server equipment received from said household-electric-appliances equipment through said in-house network, Repeating installation characterized by having a transmitting means to perform transmission to said household-electric-appliances server equipment through said public network, according to the information which shows the address or the address of said household-electric-appliances server equipment under this junction demand which received.

[Claim 23] It is the repeating installation according to claim 22 characterized by performing the communication link between said 2nd household-electric-appliances device and said household-electric-appliances server equipment as the response with the transmission to said household-electric-appliances server equipment from said 2nd household-electric-appliances device for every predetermined time.

[Claim 24] Repeating installation according to claim 22 characterized by using a HTTP (Hyper Text Transfer Protocol) protocol as a protocol of the communication link between this repeating installation and said household-electric-appliances server equipment.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the repeating installation which relays the communication link between a household-electric-appliances device, the household-electric-appliances server equipment which provides a household-electric-appliances device with service via a public network and household-electric-appliances equipment, and household-electric-appliances server equipment.

[0002]

[Description of the Prior Art] In recent years, the household-electric-appliances device equipped with communication facility with other information processors etc. is developed. For example, IEEE1394 is known as a communications protocol between the so-called audiovisual equipments, such as a TV apparatus, image transcription equipment, and sound equipment. In this IEEE1394, the communication procedure between image audio equipments etc. is specified, and the actuation with which it cooperated between image audio equipments is attained.

[0003] Moreover, ECHONET (ECHONET) is known as a protocol which can be used, for example with the interface between power system household-electric-appliances devices (the so-called white-home-appliances device), such as an air conditioner, hot-water supply management equipment, a lighting system, a washing machine, a refrigerator, and a microwave oven. In this ECHONET, although communicated using wireless circuits, such as an electric wave and infrared radiation, what communicates using wire circuits, such as an others and electric light line, is standardized. Moreover, this ECHONET defines as an object the function which each device has, and unification of a control procedure is achieved in it. By using such ECHONET, the cooperation actuation between household-electric-appliances devices, a centralized control, etc. are possible.

[0004] Moreover, in these protocols, since direct communication cannot be carried out to networks, such as the Internet, if it remains as it is, the gateway unit which performs conversion with the TCP/IP protocol generally used in these networks is developed. By using such a gateway unit, two or more household-electric-appliances devices connected through the network can be controlled now from a remote place.

[0005] In order to absorb the difference in the environment for every user, or the difference in the demand for every user, the program which receives the management from a remote place is downloaded via a network to the above household-electric-appliances devices, or the program which receives the management from a remote place is beforehand stored in the household-electric-appliances device, and to consider as the operating state which accepts the management from a remote place via a network is desired.

[0006]

[Problem(s) to be Solved by the Invention] However, since the communications protocol unified by all household-electric-appliances devices as mentioned above is not established, the communications protocol which can be used by the household-electric-appliances device varies with the environment where the household-electric-appliances device concerned is installed.

[0007] Moreover, it was difficult from viewpoints, such as constraint of cost, to mount the program corresponding to all communications protocols in each household-electric-appliances device beforehand so that it could respond to all installation environments.



[0008] This invention is made in view of an above-mentioned technical problem, and aims at offering the household-electric-appliances device which can realize easily management from the remote place of the household-electric-appliances device by which installation environments differ, household-electric-appliances server equipment, a gateway unit, and a household-electric-appliances control system.

[0009]

[Means for Solving the Problem] In order to solve an above-mentioned problem, the household-electric-appliances device concerning claim 1 of this invention It is the household-electric-appliances device which applies for use of service to the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that it might belong to two or more categories and there might be no duplication between household-electric-appliances server equipment and the household-electric-appliances device which can perform a communication link, The means of communications which performs a communication link with household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-electric-appliances device It holds for every owner and is characterized by having a service request means to transmit the offer demand of service to the household-electric-appliances device (2nd household-electric-appliances device) of the identification information of the household-electric-appliances device (1st household-electric-appliances device) concerned, and the owner of the household-electric-appliances device concerned to the household-electric-appliances server equipment which manages offer of service for every owner.

[0010] Moreover, the household-electric-appliances device concerning claim 4 of this invention is a household-electric-appliances device using the service offered from the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that it might belong to two or more categories and there might be no duplication between household-electric-appliances server equipment and the household-electric-appliances device which can perform a communication link, The means of communications which performs a communication link with household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-electric-appliances device It holds for every owner. Offer of service to every owner The household-electric-appliances server equipment to manage a service request Starting of the service use software beforehand built into the service use software transmitted according to the offer demand of service to the identification information of the household-electric-appliances device which the household-electric-appliances device (1st household-electric-appliances device) to transmit transmitted, and the household-electric-appliances device (2nd household-electric-appliances device) concerned, or the household-electric-appliances device concerned It is characterized by having a receiving means to receive the command to direct through means of communications, and a service use means to perform the service use software concerned according to the service use software or the command which received, and to receive offer of the service from a household-electric-appliances server.

[0011] A household-electric-appliances device means the electronic equipment used at a home etc., for example, the so-called audiovisual equipments, such as a TV apparatus besides power system household-electric-appliances device \*\*\*\*\* white-home-appliances devices, such as an air conditioner, hot-water supply management equipment, a lighting system, a washing machine, a refrigerator, and a microwave oven, image transcription equipment, and sound equipment, are contained.

[0012] Moreover, the household-electric-appliances server equipment concerning claim 12 of this invention It is household-electric-appliances server equipment which offers the service to a household-electric-appliances device through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that there might be no duplication between the household-electric-appliances devices which belong to two or more categories and can perform household-electric-appliances server equipment and a communication link concerned for every owner, The identification information concerned of the 1st household-electric-appliances device transmitted from the household-electric-appliances device (1st household-electric-appliances device) which requires use of service, A receiving means to receive the use demand of service including the information which shows the household-electric-appliances device (2nd



household-electric-appliances device) using service, A check means to check whether the household-electric-appliances device corresponding to the information which shows the 2nd household-electric-appliances device which the owner corresponding to the identification information of the 1st household-electric-appliances device which received received is owned with reference to an identification information maintenance means, When it is checked that the owner corresponding to the use demand of service in a check means owns the 2nd household-electric-appliances device, starting of the service use software beforehand built into addressing to a household-electric-appliances device of the 2nd by service use software or the household-electric-appliances device concerned It is characterized by having a transmitting means to transmit the command to direct.

[0013] Moreover, the repeating installation concerning claim 22 of this invention They are the in-house network to which the household-electric-appliances device using the service which the household-electric-appliances server equipment connected via the public network offers was connected, and the repeating installation installed between said household-electric-appliances server equipment. The effective address (local address) is assigned to the household-electric-appliances device only within the in-house network. A receiving means to receive the junction demand which has the information which shows the address or the address of household-electric-appliances server equipment received from household-electric-appliances equipment through the in-house network, It is characterized by having a transmitting means to perform transmission to household-electric-appliances server equipment through a public network, according to the information which shows the address or the address of household-electric-appliances server equipment under junction demand which received.

[0014]

[Embodiment of the Invention] This invention is applicable to the household-electric-appliances control system which manages for example, a household-electric-appliances device collectively.

[0015] The household-electric-appliances control system concerning the 1st operation gestalt which applied the 1st operation gestalt (configuration) this invention For example, the 1st 10 and the private network of the 2nd network 20 grade which were installed in the building 1 as shown in drawing 1 , The household-electric-appliances server equipment 40 and the terminal unit 50 which were connected through these networks 10 and 20 and the 3rd network (public networks, such as the Internet) 30 of the building 1 exterior, It has personal digital assistant equipment 70 connected to a network 30 through a base station 65 and a gateway unit 60.

[0016] The 1st network 10 is a network where the household-electric-appliances device of for example, an acoustic-imaging (AV:Audio Visual) system is connected, for example, consists of a cable network using protocols, such as IEEE1394, as the physical layer. This network 10 is equipped with the image transcription equipment 13 which performs record/playback of image information using record media, such as the television receiver (TV equipment) 12 connected through the wire circuit 11, a magnetic tape, a magnetic disk, and an optical disk, the sound equipment 14 which performs record/playback of speech information, such as music, using record media, such as a magnetic tape, a magnetic disk, an optical disk, and memory, and the router equipment 19 which perform protocol conversion of the physical layer of a wire circuit 11 and a network 30, path control, etc.

[0017] TV equipment 12 For example, communication link I/F121 which performs the communication link with a wire circuit 11, For example, the input section 122 which inputs the directions from a user through remote control, the switch formed in the body, The receive section 123 which receives broadcast of an image, data, etc., and the web browser 124 which acquires the contents offered by HTTPd42a, It has the display 125 which displays the image in which the demand of directions to the image or user whom the receive section received is shown, the control section 126 which controls actuation of the whole equipment, and the household-electric-appliances ID attaching part 129 which holds the household electric appliances ID of a proper for each device of every.

[0018] This TV equipment 12 can use now application service of the service offered by the service (for example, contents distribution) offered by household-electric-appliances server equipment 40, or the household-electric-appliances server equipment 40 concerned.

[0019] Router equipment 19 is equipped with communication link I/F291 which performs the communication link with a network 30, communication link I/F292 which performs the communication link with a network 10, and the routing control section 193 which performs processing of path control etc.

[0020] Moreover, the 2nd network 20 is a network where the household-electric-appliances device \*\*\*\*\* white-home-appliances device of for example, a power system is connected, for example, consists of a wireless

network using the radio protocol as the physical layer. This network 20 is equipped with the router equipment 29 which performs path control of the air conditioner 22 connected through the wireless circuit 21, hot-water supply management equipment 23, a refrigerator 24, a microwave oven 25 (not shown [ a part ]), and the wireless circuit 21 and a network 30 etc. In addition, this network 20 is not restricted to this wireless network, for example, is good also as a cable network using the power line etc. as a channel etc.

[0021] An air conditioner 22 For example, radio I/F221 which performs the communication link with router equipment 29 through the wireless circuit 21, For example, the input section 222 which inputs the directions from a user through remote control, the switch formed in the body, For example, radio I/F223 which performs above-mentioned router equipment 29 and radio using infrared radiation, IEEE802.11, or Bluetooth (trademark), With the temperature sensor 224 which measures a room temperature, for example, the exterior unit control section 225 which controls the exterior unit which has a compressor, a heat exchange machine, etc., It has the control section 226 which controls actuation of exterior unit control-section 225 grade according to the directions supplied through household-electric-appliances server equipment 40, and the household-electric-appliances ID attaching part 229 which holds the household electric appliances ID of a proper for each device of every.

[0022] Hot-water supply management equipment 23 is equipped with router equipment 29, communication link I/F231 which performs a communication link, the display 232 which has the display screen, the input section 233 which inputs the directions from a user, and a display 232 and the control section 234 which controls input section 233 grade through the wireless circuit 21.

[0023] The refrigerator 24 is equipped with router equipment 29, communication link I/F241 which performs a communication link, the display 242 which has the display screen, the input section 243 which inputs the directions from a user, and a display 242 and the control section 244 which controls input section 243 grade through the wireless circuit 21.

[0024] The microwave oven 25 is equipped with router equipment 29, communication link I/F251 which performs a communication link, the display 252 which has the display screen, the input section 253 which inputs the directions from a user, and a display 252 and the control section 254 which controls input section 253 grade through the wireless circuit 21.

[0025] Router equipment 29 is equipped with communication link I/F291 which performs the communication link with a network 30, above-mentioned communication link I/F221 and radio I/F292 which performs radio, and the routing control section 293 which performs processing of path control etc.

[0026] A network 30 consists of a network using the optical fiber as transmission lines, such as a network or FTTH which used the metal cable as transmission lines, such as ISDN, CATV, ADSL, and an analog dedicated line, and performs the \*\*\*\* communication link for TCP/IP protocols in this network 30, for example. Or you may make it the above networks constitute the part outside a building 1 for the part in the building 1 of the networks 30 using the network of for example, IEEE802.3 grade.

[0027] Household-electric-appliances server equipment 40 consists of an information processor which has auxiliary storage units, such as MPU, memory, and HDD, and processing of control of actuation of the device connected to each above-mentioned networks 10 and 20 etc. is performed. this -- household electric appliances -- a server -- equipment -- 40 -- a communication interface (I/F) -- 41 -- a terminal unit -- 50 -- or -- a personal digital assistant -- equipment -- 70 -- from -- directions -- following -- each -- a network -- ten -- 20 -- connecting -- having -- \*\*\*\* -- a device -- control -- etc. -- service -- or -- being concerned -- service -- an application -- service -- etc. -- providing -- service provision -- the section -- 42 -- this -- service provision -- the section -- service -- offer -- a sake -- using -- data -- etc. -- holding -- a database -- (-- DB --) -- 43 -- having -- \*\*\*\* .

[0028] Communication link I/F41 performs communications control for using the service offered by the service provision section 42 by network 30 course etc.

[0029] the HTTP server (HTTPd) 42 which the service provision section 42 makes a front end the web browser which is functioning in TV equipment 12, a terminal unit 50, and 70 grades, and offers service -- it has DB engine 42b which controls access to a and DB43 etc. Moreover, DB43 is equipped with customer DB42a holding the information about each user (customer), and household-electric-appliances DB42b holding information, such as a function about each household-electric-appliances device.

[0030] In addition, although the router equipments 19 and 29 are respectively formed in the network 10 and the network 20 with the above-mentioned configuration, it is good also as a configuration which you may make it form only one router equipment which has communication link I/F corresponding to wire-circuit 11 and wireless circuit 21 each, or subdivides a network 10 or a network 20, and forms three or more router equipments.

[0031] Above-mentioned TV equipment 12, an air conditioner 22, and -- are the so-called "network household electric appliances" which mounted the TCP/IP protocol respectively. The IP address (global address) of the proper which does not have duplication to all the device respectively connected to a network 30 is assigned to these TV equipments 12, an air conditioner 22, and --. Although the version of this IP address may be IPv4 or may be IPv6, it is taken as the IP address of the same version with each household-electric-appliances devices 22 and 23 and the router equipment 29 which are connected to the network 20.

[0032] Moreover, in this household-electric-appliances control system, the identification information (household electric appliances ID) of at least one proper is respectively assigned to all the devices managed with household-electric-appliances server equipment 40. Even if the manufacturers of a device differ, these household electric appliances ID are managed so that there may be no duplication. At the time of manufacture, these household electric appliances ID are embedded at the household-electric-appliances ID attaching part 129,229, and are held so that it cannot change. Furthermore, by approaches, such as encryption, when required, it is held so that household electric appliances ID may not be known directly. Specifically, it can mount as registers in IC chip which constitutes control sections 126 and 226 etc.

[0033] As household electric appliances ID, the MAC (Media Access Control) address of an IP address (global address), Bluetooth-ID, and the EUI64 grade of IEEE1394 can also be used as it is. Since these addresses are managed so that there may be no duplication each whole device essentially, they can be contributed to reduction of the management burden of household electric appliances ID by diverting these as household electric appliances ID. In addition, even if it is the case where other addresses are diverted as household electric appliances ID in this way, these addresses and household electric appliances ID are managed as an independent value which has another semantics logically, and in order that household-electric-appliances server equipment 40 may identify each household-electric-appliances device, they are used.

[0034] In customer DB43a, for example, the information for identifying each user, as shown in drawing 2 (user name), The household electric appliances ID of all the household-electric-appliances devices that information (User Information) and the user concerned own about the user concerned (the household electric appliances ID of possession household electric appliances) The information (classification and part number) which shows the classification and the part number of the household-electric-appliances device concerned, the information which shows the correspondence procedure to the household-electric-appliances device concerned (access; for example, IPv6, IPv4, etc.), The correspondence table which matches the information (remote-control propriety) which shows the propriety of the address (address) of the possession household-electric-appliances device concerned and remote control of the possession household-electric-appliances device concerned is stored.

[0035] In addition, you may be the value of the name (for example, DNS name) which may be the value of an IP address itself and is assigned to a household-electric-appliances device about the address of said household-electric-appliances device. To be a name, household-electric-appliances server equipment needs to do first the activity which changes the value of this name into an IP address.

[0036] A user name is good also as information which is sufficient for each user if it is the information on a proper, for example, is given to him for convenience on management of a customer number etc.

[0037] The information about a user consists of information which shows liking of the address of the user concerned, a name, age, an occupation, the telephone number, the provider (provider) of network connection service, an e-mail address, and the user concerned etc., for example. Moreover, you may make it the description approach of the information about a user include all the family's devices by making information of the householder instead of one certain user into representation, and it may register the firm name as an owner about the household-electric-appliances device which a certain firm holds.

[0038] Moreover, the household electric appliances ID of possession household electric appliances are the household electric appliances ID currently held at the above-mentioned household-electric-appliances ID attaching parts 129 and 229. In case a user purchases a household-electric-appliances device, these household

electric appliances ID are matched with the name of the user concerned etc., and are inputted into DB engine 42b. In case a user purchases a household-electric-appliances device, the form in which the address, a name, etc. are entered from a dealer etc. is offered, the salesclerk of a dealer etc. inputs the contents which the user filled in through the terminal unit connected to household-electric-appliances server equipment 40 by the network 30 course, and, specifically, the terminal unit concerned supplies the inputted information to DB engine 42b.

[0039] Or the application of use of services, such as remote operation which minded the household-electric-appliances server at the time of this purchase, may be accepted. A user provides with the use application form in which the information which specifies the service used with the address, a name, etc. in this case is written down, and the salesclerk of a dealer etc. supplies the household electric appliances ID of information, such as the address, the name, age, an occupation, the telephone number, an electronic mail, and liking, and the information which shows the service to be used which the user wrote down in the use application form, and the purchased device to DB engine 42b through a terminal unit etc. like \*\*\*\*.

[0040] The information supplied to DB engine 42b as mentioned above is supplied to customer DB43a through DB engine 42b, and information, such as the household electric appliances ID which show the household-electric-appliances device which the user purchased, matches it with the user name of the user concerned, and User Information, and it is recorded on the correspondence table in customer DB43a.

[0041] In addition, entry of each item of a use application form makes only the thing required for offer of service indispensable, and a necessarily unnecessary thing may be taken as a user's arbitration. Moreover, registration of information, such as a user's address and a name, and household electric appliances ID may be the time of applying for use of the service which an after [ purchase ] at-any-time [ not the time of the purchase of a device but ] or household-electric-appliances server offers etc. Although the operator of household-electric-appliances server equipment 40 etc. may be made to input this application into DB43 according to the application form mailed by the telephone or user from a user, a user operates the web browser currently performed with the terminal unit connected to networks 10 and 20 or a network 30, and may be made to input it via HTTPd42a.

[0042] In this customer DB43a, a part of User Information [ at least ], such as every user name, the same user name, and the address, manages the household electric appliances ID of the registered device etc. for every same user. He is trying for all conditions, such as a user name and the address, to manage the information about the household-electric-appliances device which the user concerned owns for every same user in this drawing 2.

[0043] By considering customer DB43a as such a configuration, a list of the household-electric-appliances device which the user concerned owns by using a user name or User Information as a search key can be searched now.

[0044] Moreover, it matches with the household electric appliances ID of each device, and the information which shows the classification (for example, exceptions, such as TV equipment, image transcription equipment, an air conditioner, and hot-water supply management equipment) of a household-electric-appliances device, the manufacturer/part number of a household-electric-appliances device, the date of manufacture, purchase hysteresis, maintenance record, etc. is recorded on this customer DB43a.

[0045] moreover, it is shown in above-mentioned drawing 2 R> 2 at this customer DB43a -- as -- the access approach ("access": -- the information which shows exceptions, such as the approach of networks, such as the Internet, a telephone, or others, --) from a household-electric-appliances server to the household-electric-appliances device concerned [ in drawing 2 ] The information which always shows exceptions, such as the approach of connection, the so-called dial up which sets up connection at the time of the need, or others, The addresses (information which shows the addresses, such as an IP address, the telephone number, and a proxy server, information which shows the access approach) of the household-electric-appliances device concerned match with the household electric appliances ID of each household-electric-appliances device the information which shows whether address translation etc. may enter on the way, and it is recorded.

[0046] In addition, at the time of the purchase of a household-electric-appliances device, or the application of service, a part of information corresponding to household electric appliances ID can be a blank. For example, in case the IP address of a household-electric-appliances device connects the household-electric-appliances device concerned to a network, in order to set it up, it is thought at the time of purchase that the case of being unknown is common.

[0047] In this case, before offer of service is started, the information on access in above-mentioned drawing 2,

the address, etc. is registered. An IP address is assigned to this household-electric-appliances device in case the household-electric-appliances device which the user purchased is specifically connected to the network 20 grade in \*\*. Then, through router equipment 29 grade, the household-electric-appliances device concerned supplies the information which shows the household electric appliances ID of a self-device, the assigned IP addresses (the IPv4 address, the IPv6 address, DNS name, etc.), and the access approach to DB engine 42b, and requires registration of it. Each household-electric-appliances device has held the address of household-electric-appliances server equipment 40, the access approach to household-electric-appliances server equipment 40, etc. beforehand, and each household-electric-appliances device supplies household electric appliances ID, an IP address, etc. to household-electric-appliances server equipment 40 according to these.

[0048] Thus, if household electric appliances ID, an IP address, etc. are supplied, DB engine 42b of household-electric-appliances server equipment 40 will register the supplied household electric appliances ID, an IP address, etc. into customer DB43a.

[0049] In addition, although it is not limited to the configuration shown in this drawing 2 and has the same logical structure as this customer DB43a, physically, multiple files etc. distribute, customer DB43a is stored in them, and you may make it constitute it by matching these with a pointer.

[0050] Moreover, as shown in drawing 3, for each household-electric-appliances device of every, an available function is matched with the information (classification, part number) for identifying the household-electric-appliances device here by household-electric-appliances DB43b, and is held at it. Moreover, the image which matches with household electric appliances ID or a product part number, and shows a general view of specifications, such as the information about a household-electric-appliances device, for example, a dimension, and power consumption, or the household-electric-appliances device concerned to this household-electric-appliances DB43b may be stored.

[0051] (Actuation)

(1) It is at supply of the program over a household-electric-appliances device, and the time, and the household-electric-appliances device of above-mentioned TV equipment 12 and air-conditioner 22 grade is constituted so that actuation can be managed according to a communication message with the exterior through communication link I/F121 or radio I/F221 etc. For this reason, household-electric-appliances server equipment 40 can be connected with these devices, and the operating state using the service offered from household-electric-appliances server equipment 40, then the service which the household-electric-appliances server equipments 40, such as remote operation, remote maintenance, or software distribution, offer, for example can be used now.

[0052] With this operation gestalt, since the TCP/IP protocol is mounted in the household-electric-appliances device connected to each networks 10 and 20, if it connects with a network 30 through the router equipments 19 and 29, a communication link can be performed with household-electric-appliances server equipment 40.

[0053] The control section of each household-electric-appliances device has held beforehand information (for example, "server.kaden.co.jp" etc.), such as URL (Unified Resource Locator) which shows the address of the household-electric-appliances server equipment 40 which offers service. Or IP addresses (for example, "Z" etc.) may be held as they are.

[0054] Or you may make it acquire the address of the household-electric-appliances server equipment 40 which offers service from the data which the receive section 123 grade of TV equipment 12 received, for example. It specifically matches with images, such as commercials of a household-electric-appliances device (for example, air conditioner 22) which offer service, and the address of the information for identifying the household-electric-appliances device concerned and the household-electric-appliances server equipment 40 which offers the service to the household-electric-appliances device concerned is supplied.

[0055] Or the address of household-electric-appliances server equipment 40 is acquired, and a user inputs the acquired address for example, through web browser 124 grade, and may be made to supply the household-electric-appliances device which receives offer of the service concerned for the inputted address separately.

[0056] Moreover, in order for a user to actually use the service which household-electric-appliances server equipment 40 offers, it is necessary to change into the condition that the program concerned which offers the program for performing processing for using the service concerned for a household-electric-appliances device, or is beforehand mounted in the household-electric-appliances device can be performed.

[0057] By the way, the demand of offer of service etc. to household-electric-appliances server equipment 40 is performed using the device of the terminal unit 50, the personal digital assistant equipment 70, or the TV equipment 12 grade which has the display function which displays the directions to the input function and user who input the directions from a user etc.

[0058] For example, in receiving offer of service of the remote operation to an air conditioner 22, a user operates TV equipment 12 and demands offer of service of the remote control concerned of household-electric-appliances server equipment 40.

[0059] As shown in drawing 4, a user inputs information, such as the address with an above-mentioned user, and a name, etc. into the application form which the web browser 124 of TV equipment 12 displays on a display 125, and, specifically, the application of remote-control service of an air conditioner 22 is directed (S1). This application form may be beforehand stored in TV equipment 12 like the above-mentioned household electric appliances ID. Or only the URL of the form for which it applies is stored in TV equipment 12, and a web browser 124 applies from the URL concerned, and you may make it acquire form according to the directions from a user.

[0060] If a user inputs the information for identifying the service (in this case, remote control of an air conditioner 22) which requires the information about users, such as the address, a name, etc. which were inputted into application form, household electric appliances ID (in this case, "A" which is the household electric appliances ID of TV equipment 12), and offer etc., a web browser 124 will generate an application message including such information, will encipher this, and will transmit to household-electric-appliances server equipment 40. Specifically, this application message is enciphered and transmitted by procedures, such as SSL (Secure Sockets Layer). The transmitted application message is supplied to household-electric-appliances server equipment 40 through communication link I/F121, router equipment 19, and a network 30 (S2). In addition, the household electric appliances ID of TV equipment 12 may have composition which is automatically passed to household-electric-appliances server equipment 40, even if a user does not input.

[0061] The supplied application message is supplied to DB engine 42b through communication link I/F41 and HTTPd42a. The classification, the part number, etc. of the information (user name) of the user corresponding to [ apply, extract the household electric appliances ID in a message, and / with reference to customer DB43a ] the household electric appliances ID concerned in DB engine 42b to whom DB engine 42b was supplied, and a household-electric-appliances device are acquired (S3). Furthermore, DB engine 42b acquires the information on the image of the household-electric-appliances device concerned etc. from household-electric-appliances DB43b, and supplies it to HTTPd42a. HTTPd42a generates the data of the data (for example, HTML (Hyper Text Markup Language) format or XML(eXtensible) Markup Language) format on which the check screen to the application of offer of service including the definition of the carbon button which inputs display directions of the supplied image data and the check directions from a user etc. is displayed. The generated data are supplied to TV equipment 12 through communication link I/F41 (S4).

[0062] In the data of such a check screen, DB engine 42b may define the display of the purchase hysteresis acquired from customer DB43a, maintenance hysteresis, etc., for example.

[0063] By the way, before creating the data of such a check screen, a function with the available household-electric-appliances device corresponding to the classification and the part number of the household-electric-appliances device which DB engine 42b acquired in above-mentioned S3 with reference to the correspondence table stored in household-electric-appliances DB43b is checked, and you may make it judge whether it is actually available in the service which the user is demanding. In this case, if HTTPd42a has the available service which the user demanded, it will perform processing of S4, but when not available, generates the data in which the purport which is not available is shown separately, and transmits to TV equipment 12.

[0064] By performing such processing, a user can recognize the use propriety of service, can perform demand processing of offer of service again, and can contribute to improvement in operability.

[0065] If the data of the above check screens are supplied, a web browser 124 will display the screen according to the data concerned on a display 125, and will require a check of a user (S5).

[0066] If the user who looked at such a check screen operates the input section 122 and inputs check directions, a web browser 124 will generate the message of an Acknowledgement and will transmit to household-electric-appliances server equipment 40 (S6).



[0067] If such an Acknowledgement is supplied, HTTPd42a transmits a predetermined command to an air conditioner 22, after processing authentication of an air conditioner 22, exchange of a key, etc. by SSL (S7), and after making an air conditioner 22 into the condition of receiving a program, the program which receives remote control will be supplied (S8).

[0068] This program will be supplied to a control section 225 through router equipment 29 and radio I/F221, will be stored in the memory with which a control section 225 is equipped, and will be in a running state (S9).

[0069] It is in this condition, for example, if the command of remote control is supplied to air-conditioner 22 from household-electric-appliances server equipment 40, an air conditioner 22 will be in the condition that actuation can be controlled according to the command concerned.

[0070] If offer of a program is successful, DB engine 42b will change from "no" the information in customer DB43a corresponding to the household-electric-appliances device which offered the program (remote-control propriety) into "it is good."

[0071] By the way, in this household-electric-appliances control system, direct communication can be carried out now with the relation of end to end (End to End) using the same protocol (for example, TCP/IP) between the air conditioners 22 which receive offer of the TV equipment 12 which requires offer of household-electric-appliances server equipment 40 and service, or service. For this reason, the program which applied through router equipment 19 as mentioned above, supplied the message to household-electric-appliances server equipment 40, and was supplied according to this can be supplied to the air conditioner 22 which receives offer of service as it is through router equipment 29.

[0072] Moreover, in this household-electric-appliances control system, the household electric appliances ID of a proper were held to each household-electric-appliances device, and the household electric appliances ID of the household-electric-appliances device which each user owns are managed. For this reason, in the household-electric-appliances server equipment 40 side, the user corresponding to household electric appliances ID can be specified only by providing the demand of offer of service with household electric appliances ID.

[0073] Moreover, by holding the classification and the part number of the household-electric-appliances device corresponding to household electric appliances ID, and the available function, the available function corresponding to household electric appliances ID can be specified, and it can check at the time of the application of offer of service.

[0074] In addition, although above-mentioned explanation showed the case where a user demanded offer of remote-control service of an air conditioner 22 of household-electric-appliances server equipment 40 using TV equipment 12 As long as it has the display which performs the display to the input section and the user who input the directions from a user, it may be made to require service of household-electric-appliances server equipment 40, for example using other terminal unit or other household-electric-appliances devices of a terminal unit 50 and personal digital assistant equipment 70 grade.

[0075] In above-mentioned explanation, moreover, in an application message The household electric appliances ID of a household-electric-appliances device ("A" which is the household electric appliances ID of TV equipment 12 in an above-mentioned example) which transmit the application message concerned are transmitted. The list of household electric appliances ID of the household-electric-appliances device which the user of the household-electric-appliances device by which household-electric-appliances server equipment 40 transmitted the application message concerned with reference to customer DB43a owns is acquired. Data (for example, data of a HTML format or an XML format) including description of the processing for performing displays corresponding to these household electric appliances ID and these selections are created. A web browser 124 is supplied through HTTPd42a, and you may make it choose household electric appliances ID according to the directions which the user inputted according to this. Moreover, you may make it specify the household electric appliances ID of the household-electric-appliances device which receives offer of service in an above-mentioned application message.

[0076] Moreover, although above-mentioned explanation showed the case where the service whose user receives offer was specified in an above-mentioned application message In the household-electric-appliances device corresponding to the household electric appliances ID to which DB engine 42b was supplied from the TV equipment 12 grade an available function It acquires from the correspondence table currently held at household-electric-appliances DB43b, data including description of the processing which performs displays and these



selections of an available function are generated, and it applies for the function directed by the user according to this, and may be made to consider as the target service. Or you may make it check to a user whether it is good with the service which DB engine 42b guessed and guessed that service for an application was according to the function acquired from household-electric-appliances DB43b.

[0077] (2) Use of service (remote control)

As mentioned above, if the program for receiving the remote-control service from household-electric-appliances server equipment 40 will be in a running state, an air conditioner 22 will be in the condition of supervising the input of household-electric-appliances server equipment 40 to a directive command other than the directions input from the input section 222.

[0078] Although a user can use remote-control service even if he uses any of a terminal unit 50 or personal digital assistant equipment 70, he explains the case where personal digital assistant equipment 70 is used, by the following explanation.

[0079] If a user directs use of remote-control service, personal digital assistant equipment 70 will perform log in processing to household-electric-appliances server equipment 40 (S11). In this log in processing, personal digital assistant equipment 70 transmits authentication information to household-electric-appliances server equipment 40. If it checks that authentication information is just, household-electric-appliances server equipment 40 will exchange the key for the encryption communication link by SSL etc. between personal digital assistant equipment 70. moreover, him, such as an input of the user ID and the password which were beforehand assigned to the user if needed, -- authentication for a check may be performed.

[0080] After exchange of a key is completed, the web browser 74 of personal digital assistant equipment 70 requires transmission of the data (household-electric-appliances control page) for directing remote control of an air conditioner 22 from HTTPd42a (S12).

[0081] HTTPd42a supplies the data with which the selection input of the input column or command which inputs a command etc. was defined to a web browser 74 as data of a household-electric-appliances control page to such a demand (S13).

[0082] If such data are supplied, a web browser 74 will display the image according to the data concerned on a display 73. The display to which the input of the temperature set up, for example is urged in this image is included. If a user requires that the key of "2" and "5" prepared in the input section 72 should be pressed, and laying temperature should be made into 25 degrees C from this image (S14) The message of the purport which makes laying temperature of an air conditioner 22 25 degrees C is generated by the web browser 74, and transmits the message (temperature setting demand) concerned to household-electric-appliances server equipment 40 (S15).

[0083] If such a temperature setting demand is received, DB engine 42b will acquire the information on the access approach (access in drawing 2 R> 2) from the correspondence table in customer DB43a to the air conditioner 22 of the user concerned, the address, etc. The service provision section 42 performs authentication processing and the message exchange of a key between air conditioners 22 by the acquired access approach (S16).

[0084] If these processings are successful, the service provision section 42 will encipher the temperature setting demand from the above-mentioned web browser 74, will attach a digital signature, and will supply it to an air conditioner 22 (S17).

[0085] The signature of the supplied temperature setting demand checks a control section 225, if just, a temperature setting demand will be decrypted (S18), and it will interpret and execute the decrypted command (S19).

[0086] Furthermore, when such remote control is successful, a control section 225 generates the information which shows that, it transmits to household-electric-appliances server equipment 40 (S20), household-electric-appliances server equipment 40 transmits this to personal digital assistant equipment 70 (S21), and you may make it notify the purport that remote control was successful with the display 73 (S22).

[0087] (Effectiveness) As explained above, the household-electric-appliances device connected to the network in \*\* from the terminal unit of remote places, such as personal digital assistant equipment, is easily controllable by the household-electric-appliances control system of this 1st operation gestalt. Therefore, even if it is the household-electric-appliances device by which installation environments differ, the management from a remote place is easily realizable.

[0088] (Modification) The command uniquely specified also by the standardized command which is not restrained, for example, is defined by HTTP etc. is sufficient as especially the protocol used in the communication link between the personal digital assistant equipment 70 under processing shown in the communication link between the TV equipment 12 under processing shown in still more nearly above-mentioned drawing 4 , and household-electric-appliances server equipment 40, or above-mentioned drawing 5 , and household-electric-appliances server equipment 40.

[0089] When using HTTP, even if it is the case where equipments, such as a fire wall and a proxy, are arranged between household-electric-appliances server equipment 40, the communication link between household-electric-appliances server equipment 40 can be easily enabled by changing a setup of these equipments suitably.

[0090] In the 2nd operation gestalt above-mentioned household-electric-appliances control system of the 1st operation gestalt, the TCP/IP protocol is respectively mounted in the household-electric-appliances device connected to the 2nd network 20 of an air conditioner 22 and hot-water supply management equipment 23 grade, and the IP address was respectively assigned to each household-electric-appliances devices 22 and 23.

[0091] However, it can also constitute from ECHONET so that it may connect with a network 30 through the gateway unit which changes the protocol of ECHONET, and protocols, such as TCP/IP, into it since it is not necessary to necessarily mount protocols, such as TCP/IP, in each device.

[0092] (Configuration) In the household-electric-appliances control system concerning the 2nd operation gestalt of this invention, as shown, for example in drawing 6 , it has the network 80 instead of the network 20 in above-mentioned drawing 1 . In this network 80, it differs in the above-mentioned network 20, and communicates with the original protocol of ECHONET.

[0093] Unlike the 1st above-mentioned operation gestalt, the IP address is not assigned to the air conditioner 22 and the hot-water supply management equipment 23 which are connected to this network 80. In addition, household electric appliances ID are assigned to each devices 22, 23, and 89 as a value of a proper like the 1st above-mentioned operation gestalt.

[0094] For this reason, in this network 80, it has the gateway unit 89 which changes the protocol (ECHONET) used in the network 80 instead of above-mentioned router equipment 29, and the protocol (TCP/IP) used in the network 30.

[0095] This gateway unit 89 is equipped with communication link I/F891 for connecting with a network 30, ECHONET I/F892 for connecting with an air conditioner 22 and hot-water supply management equipment 23 grade through the wireless circuit 21 which constitutes a network 80, and the protocol conversion section 893 that performs protocol conversion. This gateway unit relays the message of addressing containing the household electric appliances ID from for example, a household-electric-appliances device etc. to household-electric-appliances server equipment 40 etc. between a network 80 and a network 30. Solution of a DNS name and protocol conversion for message junction are carried out, and, specifically, the communication link between household-electric-appliances server equipment 40 and the household-electric-appliances device of air-conditioner 22 grade is relayed.

[0096] In ECHONET used in the network 80, data are transmitted and received in a packet (ECHONET packet) unit as shown in drawing 7 . This ECHONET packet consists of a part for a header unit (ECHONET header), and a payload part (ECHONET data).

[0097] The information (destination ECHONET address) for identifying the device of a transmission place, the information (source echo network address) for identifying the device of a transmitting agency, etc. are stored in the ECHONET header. Each address is expressed with the ECHONET address assigned for every device in ECHONET.

[0098] Moreover, the destination URI (Unified Resource Identifier) of the message which I have transmitted to household-electric-appliances server equipment 40 by the information (transmitting agency object) which shows the object in the device of a transmitting agency, the information (transmission place object) which shows the object in the device of a transmission place, the property, service, and the gateway unit 89, the transfer parameter of a body, etc. are stored in the ECHONET data.

[0099] In ECHONET, a communications partner is specified by the ECHONET address assigned to each device and the object which shows the function in each device. For example, in the air conditioner 22, objects which acquire a

room temperature, for example, such as acquisition/modification of an object and laying temperature, are specified. The junction object which receives the demand of junction to a network 30 is prescribed by the gateway unit 89. The junction object which requires junction is prescribed to the junction object of a gateway unit 89 by the household-electric-appliances device with the need of requiring the junction addressed to network 30 from this gateway unit 89.

[0100] In addition, as for this drawing 7, the IP address shows the example of the ECHONET packet which transmits to addressing to a junction object of a gateway unit 89 to transmit the below-mentioned polling demand to addressing to URI whose directory name is "/kaden" by "Z" (household-electric-appliances server equipment 40).

[0101] Moreover, the TCP/IP packet used in the network 30 consists of a header and a payload, as shown in drawing 8.

[0102] The IP address (destination IP address) of the device of a transmission place, the IP address (source IP address) of the device of a transmitting agency, the port number of a transmission place, etc. are stored in the header. Moreover, the message of addressing to HTTPd42a for example, is stored in a payload.

[0103] In addition, this drawing 8 shows the example of the packet which a gateway unit 89 transmits to household-electric-appliances server equipment 40 according to the ECHONET packet (packet of polling) shown in above-mentioned drawing 7.

[0104] - the junction of a packet -- in order to perform conversion with the above ECHONET packets and a TCP/IP packet, the protocol conversion section 893 of a gateway unit 89 is equipped with the TCP/IP packet transceiver section 301 which transmits and receives a TCP/IP packet, the ECHONET packet transceiver section 302 which performs transmission and reception of the ECHONET packet, and the packet transducer 303 which performs conversion of a packet as shown in drawing 9. This ECHONET packet transceiver section 302 or the packet transducer 303 is equivalent to an above-mentioned junction object.

[0105] In this household-electric-appliances control system, the communication link to the household-electric-appliances device connected to the network 20 is performed like the 1st above-mentioned operation gestalt according to the HTTP protocol which is a higher-level protocol on a TCP/IP protocol from household-electric-appliances server equipment 40.

[0106] For this reason, the correspondence table attaching part 310 holding a table for the packet transducer 303 to perform conversion of a HTTP packet and the ECHONET packet, The status line header extract section 311 which extracts a status line header from the header of the HTTP packet from the household-electric-appliances server equipment 40 supplied from the TCP/IP packet transceiver section 301, The transfer electrical-parameter-extraction section 312 which extracts a transfer parameter from the payload of a HTTP packet, It has the transfer parameter insertion section 313 which inserts a transfer parameter in the ECHONET packet, and the echo packet formation section 314 which forms an echo packet and is supplied to the ECHONET packet transceiver section 302.

[0107] Moreover, this packet transducer 303 is equipped with the URI extract section 321 which extracts the destination URI from above-mentioned echo packet data, the transfer electrical-parameter-extraction section 322 which extracts a transfer parameter from echo packet data, the transfer parameter insertion section 323 which inserts a transfer parameter in a HTTP packet, and the HTTP packet formation section 324 which forms the HTTP packet addressed to household-electric-appliances server equipment 40.

[0108] As shown in drawing 1010, the correspondence table for conversion of a HTTP packet and the ECHONET packet is stored in the correspondence table attaching part 310.

[0109] The correspondence table showing the correspondence relation between the command by the above-mentioned ECHONET packet and the command (for example, the HTTP command to HTTPd42a) by the HTTP packet is held at the correspondence table attaching part 310. By referring to this correspondence table, the correspondence relation between the commands and the HTTP commands by the ECHONET packet can be known.

[0110] Specifically, the ECHONET address (for example, ECHONET address of an air conditioner 22 [E1]) of the household-electric-appliances device which performs the destination URI (for example, directory of HTTPd42a of an IP address [Z] and the address concerned [/kaden]) in the ECHONET data, URI, and a communication link

concerned is matched and stored in this correspondence table.

[0111] In this household-electric-appliances control system, the protocol conversion between a network 80 and a network 30 is possible by the gateway unit 89 of such a configuration. 1 to 1 (end to end) can be communicated now between the application levels currently performed by this by the household-electric-appliances device connected with household-electric-appliances server equipment 40 in the network 80. In addition, a code may be applied to this communication link in the form of end to end in this case. It becomes possible to communicate arbitration between household-electric-appliances server equipment and a household-electric-appliances device, without being known by the gateway unit by doing in this way.

[0112] - It is at polling and the time and conversion of a network 80 and the packet between network 30 is attained as mentioned above. Thereby, from the air conditioner 22 connected to the network 80, and hot-water supply management equipment 23, URI of household-electric-appliances server equipment 40 is specified, and a communication link can be started now. However, from the household-electric-appliances server equipment 40 side, the household-electric-appliances device of air-conditioner 22 grade connected through the gateway unit 89 cannot be specified directly, and a communication link cannot be started. Because, a household-electric-appliances device is because it is not set up so that the communication link by IP can be performed between direct household-electric-appliances server equipment.

[0113] For this reason, in this household-electric-appliances control system, transmission is started to household-electric-appliances server equipment 40 for every predetermined time interval from the household-electric-appliances device side which receives offer of remote-control service. The send action for such every predetermined spacing is called polling. If there is a response from the household-electric-appliances server equipment 40 to polling, the reception concerned will be received, but the household-electric-appliances device which polled stands by till the time of day which should carry out the next polling, when there is no response into predetermined time (when the control command from a household-electric-appliances server etc. is not carried in the packet which is answerback of this polling etc.).

[0114] if household-electric-appliances server equipment 40 does not have the need for transmission over a household-electric-appliances device -- polling -- ignoring (null -- you answering) -- if there is the need for transmission over the household-electric-appliances device concerned, transmission will be started as a response to polling.

[0115] In this household-electric-appliances control system, such polling processing has realized initiation of the communication link from the household-electric-appliances server equipment 40 side substantially.

[0116] In addition, about this polling period, the default is defined and modification may be possible by control from household-electric-appliances server equipment about this value at any value.

[0117] - Customer's DB configuration and household-electric-appliances server equipment 40 In order to realize offer of the service under the environment where a household-electric-appliances device with the need of performing such polling processing, and the household-electric-appliances device which can perform direct communication with a TCP/IP protocol are intermingled For example, as shown in drawing 11 R> 1, the information which shows whether the direct communication by TCP/IP is possible or there is any need for polling processing is held as access which shows the correspondence procedure to each household-electric-appliances device in the correspondence table in customer DB43a. When the direct communication by TCP/IP is possible, the information [IPv4, IPv6] which shows the version of TCP/IP is held as access, and when polling processing is required, the information which shows that, and the information [every 30 seconds] which shows spacing of [polling from a device] and polling are held.

[0118] Moreover, when the communication link by TCP/IP is possible, an IP address (for example, IP address of TV equipment 12 [X]) is held as the address, but the ECHONET address is held when polling processing is required. In addition, although the ECHONET address of a household-electric-appliances device is unknown before polling, when there is polling, the ECHONET address defined in the payload of the TCP/IP packet of the polling concerned is extracted, and it is stored as the address.

[0119] Moreover, the access approach to home gateway equipment and router equipment which perform junction of the above-mentioned polling etc., and the information about that address or a name may also be indicated by this customer DB. Of course, this home gateway equipment itself has household electric appliances ID, and these

may register with Customer DB.

[0120] (Actuation)

(1) supply of the program over a household-electric-appliances device -- the actuation at the time of applying for offer of service to household-electric-appliances server equipment 40 in the household-electric-appliances control system constituted as mentioned above For example, although processing (S31-S36) until a user operates TV equipment 12, applies for offer of service and transmits an Acknowledgement to the Acknowledgement from the household-electric-appliances server equipment 40 to this is the same as that even of S1-S6 in above-mentioned drawing 4 as shown in drawing 12 Next processings differ.

[0121] HTTPd42a which received the Acknowledgement from TV equipment 12 checks customer DB43a shown in above-mentioned drawing 11 , and acquires the access approach for the air conditioner 22 which is the candidate for offer of service. Thereby, HTTPd42a gets to know that polling processing needs the communication link to an air conditioner 22, it generates the message (powering-on directions) which directs the injection of the power source of the air conditioner 22 concerned, and the connection to a network 80 to a user so that it may make the polling from the air conditioner 22 concerned start, and it transmits to TV equipment 12 (S37). TV equipment 12 will display on a display 125 the image which directs the injection of the power source of an air conditioner 22 etc. to a user, if such powering-on directions are received (S38).

[0122] This image will be urged to the connection to powering on and the network 80 of an air conditioner 22 at a user, if the contents "turn on the electric power switch of an air conditioner and change into the condition that network connection (Internet connectivity) is made (also switch on the power source of a gateway unit if )" are shown and such an image is displayed on the display 125 of TV equipment 12.

[0123] A user switches on the power source of an air conditioner 22 according to this, and if he is required, he will connect an air conditioner 22 to a network 80 (S39).

[0124] According to this, the power source of an air conditioner 22 starts (S40), and a setup of ECHONET of the air conditioner 22 concerned is initialized, for example, the ECHONET address is determined (S41).

[0125] Then, an air conditioner 22 searches the nodes (other household-electric-appliances devices etc.) which have a "network junction function" from on a network 80. The demand of the notice of an attribute is specifically advanced in order to the nodes (other household-electric-appliances devices etc.) connected to the network 80, and a node (in this case, gateway unit 89) with a "network junction function" is detected. Then, the notice of that attribute is required from the detected node 89, i.e., the gateway unit, (S42), and the response (notice of an attribute) to this is supplied to an air conditioner 22 (S43). If a gateway unit 89 gets to know having the junction function (network junction function) to a network 30 by this, the ECHONET packet which requires that an air conditioner 22 should relay the message of above-mentioned polling to household-electric-appliances server equipment 40 will be transmitted to a gateway unit 89 (S44). This packet is relayed by the gateway unit 89 and transmitted to household-electric-appliances server equipment 40 as a TCP/IP packet (for example, HTTP packet to HTTPd42a) (S45).

[0126] Specifically as a TCP/IP packet of this polling, the packet of the POST method specified, for example in the protocol of HTTP is used. In this packet, MIME types, such as a predetermined mold, for example, "X-echonet-gateway" etc., are specified as a message of addressing to household-electric-appliances server equipment 40 which transmits. The household-electric-appliances server equipment 40 which received such a packet by this can know that the packet concerned is a command from the ECHONET node (in this case, gateway unit 89). Moreover, in the message, the value of the household electric appliances ID of the household-electric-appliances device of a transmitting agency is included, and household-electric-appliances server equipment 40 can know now the information about the thing from which household-electric-appliances device (node with household electric appliances ID) the packet of the polling which received is.

[0127] According to the above polling, HTTPd42a performs processing of processing of authentication of an air conditioner 22, exchange of a key, etc., supply of the program which receives remote control to an air conditioner 22, etc. like S7-S8 in above-mentioned drawing 4 (S46-S50). Under the present circumstances, conversion of a protocol is performed by the gateway unit 89 and junction of a packet is performed (S47, S50).

[0128] The program which realizes by this actuation whose air conditioner 22 receives remote control will be stored in the memory with which the control section 225 of an air conditioner 22 is equipped, and will be in a

running state (S51).

[0129] It is in this condition, for example, if the command of remote control is supplied to air-conditioner 22 from household-electric-appliances server equipment 40, an air conditioner 22 will be in the condition that actuation can be controlled according to the command concerned.

[0130] If offer of a program is successful, DB engine 42b will change from "no" the information in customer DB43a corresponding to the household-electric-appliances device which offered the program (remote-control propriety) into "it is good."

[0131] (2) Use of service (remote control)

As mentioned above, if the program for receiving the remote-control service from household-electric-appliances server equipment 40 will be in a running state, an air conditioner 22 will be in the condition of supervising the input of household-electric-appliances server equipment 40 to a directive command other than the directions input from the input section 222.

[0132] Although a user can use remote-control service even if he uses any of a terminal unit 50 or personal digital assistant equipment 70, he explains the case where personal digital assistant equipment 70 is used, by the following explanation.

[0133] In this household-electric-appliances control system, as shown, for example in drawing 13, processing to transmission (S64) of the Request to Send (S61) of a household-electric-appliances control page to authentication and key exchange of personal digital assistant equipment 70 (S60), and HTTPd42a, offer (S62) of a household-electric-appliances control page, a directions input (S63), and a setting demand as well as processings from S11 to S15 in above-mentioned drawing 5 is performed.

[0134] Then, DB engine 42b acquires the information on the access approach (access in drawing 11) from the correspondence table in customer DB43a to the air conditioner 22 of the user concerned, the address, etc.

[0135] In this case, since polling processing is required for the communication link to an air conditioner 22, it stands by until protocol conversion of the polling packet (S65) from an air conditioner 22 is carried out (S66) and HTTPd42a is offered (S66). If a polling packet is supplied, HTTPd42a will transmit the temperature setting demand addressed to air-conditioner 22 to a gateway unit 89 as a response to this packet (S68). This temperature setting demand is relayed by the gateway unit 89 (S69), and is supplied to an air conditioner 22 (S70).

[0136] The control section 225 of an air conditioner 22 changes laying temperature according to the temperature setting demand supplied from household-electric-appliances server equipment 40 (S71).

[0137] (Effectiveness) In this household-electric-appliances control system, as mentioned above, when performing remote control from household-electric-appliances server equipment 40 to an air conditioner 22, it waits for the polling (it is 1 time to 30 seconds) to household-electric-appliances server equipment 40 from an air conditioner 22, and the command of remote control is transmitted as a response to this polling.

[0138] Thereby, in this household-electric-appliances control system, since it cannot communicate with the protocol used in the network of the exteriors, such as the Internet, service of remote control etc. can be offered from a household-electric-appliances server equipment side also to the household-electric-appliances device which cannot start a communication link.

[0139] Moreover, in this household-electric-appliances control system, since control command in the period of the polling to household-electric-appliances server equipment 40 can be published from a household-electric-appliances device at the latest, it can contribute to improvement in responsibility easily by setting up a polling period suitably.

[0140] In case the network in the 3rd operation \*\*\*\*\* and the network of the exteriors, such as the Internet, are connected, in order to raise security, the firewall (F/W) which restricts access between these networks may be prepared.

[0141] Moreover, the router equipment for connecting with an external network using a local address in the network in \*\* may be equipped with the address translation sections, such as NAT (Network Address Translation: network address translation) or an IP masquerade. Moreover, also when the versions of the IP address of the network in \*\* and an external network differ, the address translation section is needed.

[0142] When these F/W, the address translation section, etc. are made to intervene, though the communications protocol (for example, TCP/IP) common to household-electric-appliances server equipment 40 and a household-



electric-appliances device is mounted, if it remains as it is, the communication link between these may be unable to be directly performed like the 1st above-mentioned operation gestalt.

[0143] (Configuration) In the household-electric-appliances control system concerning the 3rd operation gestalt of this invention, as shown, for example in drawing 14, it has the network 90 instead of the network 20 in above-mentioned drawing 1. In this network 90, it communicates with a TCP/IP protocol like the above-mentioned network 20. For this reason, the IP address is respectively assigned to the household-electric-appliances device connected to the network 90.

[0144] In this household-electric-appliances control system, router equipment 99 is formed instead of the router equipment 29 in above-mentioned drawing 1. This router equipment 99 is equipped with communication link I/F991 which performs the communication link with a network 30, above-mentioned communication link I/F221 and radio I/F992 which performs radio, and the routing control section 993 which performs processing of path control, the address translation in the case of being required, etc.

[0145] This routing control section 993 performs conversion with the address system (for example, a global address, IPv4 grade) used in the external network 30, and the address systems (for example, a private address, IPv6, etc.) used in the internal network 90, and relays a packet.

[0146] If conversion of the address in the routing control section 993 is conversion of a global address and a private address, specifically, processing of above-mentioned NAT or an IP masquerade will perform it. Or the processing which also performs correspondence-related conversion, such as a protocol of a high order, for example, a port number etc., further rather than a network address may perform address translation.

[0147] Application gateway functions, such as PROXY, can also be prepared in the routing control section 993 with the address translation instead of address translation.

[0148] In addition, there is no need of not necessarily preparing the function of address translation, such as NAT, the function of an application gateway, etc. in router equipment 99, and it may be prepared in a network 30 side. Moreover, two or more these functions can also be prepared between a household-electric-appliances device and household-electric-appliances server equipment 40.

[0149] By the way, direct access between a network 30 and a network 90 is restricted by above-mentioned address translation or an above-mentioned application gateway etc. Therefore, in this household-electric-appliances control system, like the 2nd above-mentioned operation gestalt, household-electric-appliances server equipment 40 cannot specify directly the IP address of the air-conditioner 22 grade connected to the network 90, and cannot start a communication link.

[0150] For this reason, in this household-electric-appliances control system, the household-electric-appliances device which can receive remote control polls to household-electric-appliances server equipment 40 like the 2nd above-mentioned operation gestalt with a predetermined time interval.

[0151] In the packet (polling packet) for this, as that format is shown, for example in drawing 15, address "Z" of household-electric-appliances server equipment 40 is specified as the destination address in a header, and the predetermined protocol (for example, "HTTP" which shows HTTPd42a) is specified as a destination port number. Moreover, in the payload of this packet, the predetermined instruction (POST instruction) etc. is defined like above-mentioned drawing 8.

[0152] Moreover, in order to realize offer of the service under the environment where a household-electric-appliances device with the need of performing the above polling processing, and the household-electric-appliances device which can perform direct communication are intermingled, household-electric-appliances server equipment 40 For example, as shown in drawing 16, the information which shows whether the direct communication by TCP/IP is possible or there is any need for polling processing is held as access which shows the correspondence procedure to each household-electric-appliances device in the correspondence table in customer DB43a. When the direct communication by TCP/IP is possible, the information [IPv4, IPv6] which shows the version of TCP/IP is held as access, and when polling processing is required, the information which shows that, and the information [every 30 seconds] which shows spacing of [polling from a device] and polling are held.

[0153] Moreover, when the communication link by TCP/IP is possible, an IP address (for example, IP address of TV equipment 12 [X]) is held as the address, but when polling processing is required, since the direct attainment of the packet cannot be carried out, the information [attainment is impossible] which shows things is held.



[0154] Moreover, the access approach to the router equipment which performs junction of the above-mentioned polling etc., and the information about that address or a name may also be indicated by this customer DB. Of course, this router equipment itself has household electric appliances ID, and these may register with Customer DB.

[0155] (Actuation)

(1) supply of the program over a household-electric-appliances device -- the actuation at the time of applying for offer of service to household-electric-appliances server equipment 40 in the household-electric-appliances control system constituted as mentioned above. For example, as shown in drawing 17, a user operates TV equipment 12 and applies for offer of service. Although processing (S81-S90) until it transmits an Acknowledgement to the Acknowledgement from the household-electric-appliances server equipment 40 to this and a user switches on the power source of an air conditioner 22 further is the same as that even of S31-S40 in above-mentioned drawing 12, next processings differ.

[0156] If the power source of an air conditioner 22 starts (S90), a setup of a network 90 will be initialized by radio I/F221, for example, as for the air conditioner 22 concerned, the private address of a proper will be determined as an air conditioner 22 in a network 90 (S91).

[0157] Then, an air conditioner 22 transmits the packet of above-mentioned polling to router equipment 99 (S92). Address translation etc. is performed by router equipment 99, this packet is relayed (S93), and it is transmitted to household-electric-appliances server equipment 40 (S94).

[0158] According to such polling, HTTPd42a performs processing of processing of authentication of an air conditioner 22, exchange of a key, etc., supply of the program which receives remote control to an air conditioner 22, etc. like S48-S50 in above-mentioned drawing 12 (S95-S100). Under the present circumstances, by router equipment 99, conversion of the address etc. is performed and junction of a packet is performed (S96, S99).

[0159] The program which realizes by this actuation whose air conditioner 22 receives remote control will be stored in the memory with which the control section 225 of an air conditioner 22 is equipped, and will be in a running state (S101).

[0160] It is in this condition, for example, if the command of remote control is supplied to air-conditioner 22 from household-electric-appliances server equipment 40, an air conditioner 22 will be in the condition that actuation can be controlled according to the command concerned.

[0161] If offer of a program is successful, DB engine 42b will change from "no" the information in customer DB43a corresponding to the household-electric-appliances device which offered the program (remote-control propriety) into "it is good."

[0162] (2) Use of service (remote control)

As mentioned above, if the program for receiving the remote-control service from household-electric-appliances server equipment 40 will be in a running state, an air conditioner 22 will be in the condition of supervising the input of household-electric-appliances server equipment 40 to a directive command other than the directions input from the input section 222.

[0163] In this household-electric-appliances control system, as shown, for example in drawing 18, processing to transmission (S114) of the Request to Send (S111) of a household-electric-appliances control page to authentication and key exchange of personal digital assistant equipment 70 (S110), and HTTPd42a, offer (S112) of a household-electric-appliances control page, a directions input (S113), and a setting demand as well as processings from S60 to S64 in above-mentioned drawing 13 is performed.

[0164] Then, DB engine 42b acquires the information on the access approach (access in drawing 16) from the correspondence table in customer DB43a to the air conditioner 22 of the user concerned, the address, etc.

[0165] In this case, since polling processing is required for the communication link to an air conditioner 22, it stands by until the polling packet (S120) from an air conditioner 22 is carried out for address translation etc. by router equipment 99 (S121) and HTTPd42a is offered (S122). If a polling packet is supplied, HTTPd42a will transmit the temperature setting demand addressed to air-conditioner 22 to router equipment 99 as a response to this packet (S123). This temperature setting demand is relayed by router equipment 99 (S124), and is supplied to an air conditioner 22 (S125).

[0166] The control section 225 of an air conditioner 22 changes laying temperature according to the temperature

setting demand supplied from household-electric-appliances server equipment 40 (S126).

[0167] (Effectiveness) In this household-electric-appliances control system, as mentioned above, when performing remote control from household-electric-appliances server equipment 40 to an air conditioner 22, it waits for the polling (it is 1 time to 30 seconds) to household-electric-appliances server equipment 40 from an air conditioner 22, and the command of remote control is transmitted as a response to this polling.

[0168] Thereby, in this household-electric-appliances control system, service of remote control etc. can be offered from the network side of the exteriors, such as the Internet, also to the household-electric-appliances device which cannot start a communication link.

[0169] Moreover, in this household-electric-appliances control system, since control command in the period of the polling to household-electric-appliances server equipment can be published from a household-electric-appliances device at the latest, it can contribute to improvement in responsibility easily by setting up a polling period suitably.

[0170] In addition, in each above-mentioned operation gestalt, although the case where "identification information of a device proper" was used as household electric appliances ID was explained, bottom two or more mutually-independent identification information may exist in a world at coincidence. For example, they are the value of EUI64, the value of an IP address, the value of the telephone number, a serial number, etc. For this reason, as household electric appliances ID, it is also possible to define by "of what kind of attribute it is identification information" and the form "what No. of that identification information it is" so that it may be called "what No. of EUI64", and "what No. of the telephone number", for example.

[0171]

[Effect of the Invention] In this invention, the use demand of the service which includes the identification information of the 1st household-electric-appliances device concerned and the information which shows the household-electric-appliances device (2nd household-electric-appliances device) using service in the household-electric-appliances server equipment which offers service from the household-electric-appliances device (1st household-electric-appliances device) which requires use of service is transmitted. The household-electric-appliances server equipment which received such a use demand It checks whether the household-electric-appliances device corresponding to the information which shows the 2nd household-electric-appliances device which the owner corresponding to the identification information of the 1st household-electric-appliances device which received with reference to the identification information maintenance means received is owned. When owning is checked, the command which directs starting of the service use software beforehand built into addressing to a household-electric-appliances device of the 2nd by service use software or the household-electric-appliances device concerned is transmitted. The 2nd household-electric-appliances device which received such service use software or a command performs the service use software concerned according to the received service use software or the command, and receives offer of service from a household-electric-appliances server.

[0172] The service according to the household-electric-appliances device which the user owns can be offered by this, for example, the control program according to the installation environment of a household-electric-appliances device etc. can be offered. For this reason, the management from the remote place of the household-electric-appliances device by which installation environments differ is easily realizable.

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[Translation done.]

**\* NOTICES \***

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**TECHNICAL FIELD**

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[Field of the Invention] This invention relates to the repeating installation which relays the communication link between a household-electric-appliances device, the household-electric-appliances server equipment which provides a household-electric-appliances device with service via a public network and household-electric-appliances equipment, and household-electric-appliances server equipment.

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[Translation done.]

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**PRIOR ART**

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[Description of the Prior Art] In recent years, the household-electric-appliances device equipped with communication facility with other information processors etc. is developed. For example, IEEE1394 is known as a communications protocol between the so-called audiovisual equipments, such as a TV apparatus, image transcription equipment, and sound equipment. In this IEEE1394, the communication procedure between image audio equipments etc. is specified, and the actuation with which it cooperated between image audio equipments is attained.

[0003] Moreover, ECHONET (ECHONET) is known as a protocol which can be used, for example with the interface between power system household-electric-appliances devices (the so-called white-home-appliances device), such as an air conditioner, hot-water supply management equipment, a lighting system, a washing machine, a refrigerator, and a microwave oven. In this ECHONET, although communicated using wireless circuits, such as an electric wave and infrared radiation, what communicates using wire circuits, such as an others and electric light line, is standardized. Moreover, this ECHONET defines as an object the function which each device has, and unification of a control procedure is achieved in it. By using such ECHONET, the cooperation actuation between household-electric-appliances devices, a centralized control, etc. are possible.

[0004] Moreover, in these protocols, since direct communication cannot be carried out to networks, such as the Internet, if it remains as it is, the gateway unit which performs conversion with the TCP/IP protocol generally used in these networks is developed. By using such a gateway unit, two or more household-electric-appliances devices connected through the network can be controlled now from a remote place.

[0005] In order to absorb the difference in the environment for every user, or the difference in the demand for every user, the program which receives the management from a remote place is downloaded via a network to the above household-electric-appliances devices, or the program which receives the management from a remote place is beforehand stored in the household-electric-appliances device, and to consider as the operating state which accepts the management from a remote place via a network is desired.

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[Translation done.]

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## EFFECT OF THE INVENTION

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(Effectiveness) As explained above, the household-electric-appliances device connected to the network in \*\* from the terminal unit of remote places, such as personal digital assistant equipment, is easily controllable by the household-electric-appliances control system of this 1st operation gestalt. Therefore, even if it is the household-electric-appliances device by which installation environments differ, the management from a remote place is easily realizable.

[0088] (Modification) The command uniquely specified also by the standardized command which is not restrained, for example, is defined by HTTP etc. is sufficient as especially the protocol used in the communication link between the personal digital assistant equipment 70 under processing shown in the communication link between the TV equipment 12 under processing shown in still more nearly above-mentioned drawing 4 , and household-electric-appliances server equipment 40, or above-mentioned drawing 5 , and household-electric-appliances server equipment 40.

[0089] When using HTTP, even if it is the case where equipments, such as a fire wall and a proxy, are arranged between household-electric-appliances server equipment 40, the communication link between household-electric-appliances server equipment 40 can be easily enabled by changing a setup of these equipments suitably.

[0090] In the 2nd operation gestalt above-mentioned household-electric-appliances control system of the 1st operation gestalt, the TCP/IP protocol is respectively mounted in the household-electric-appliances device connected to the 2nd network 20 of an air conditioner 22 and hot-water supply management equipment 23 grade, and the IP address was respectively assigned to each household-electric-appliances devices 22 and 23.

[0091] However, it can also constitute from ECHONET so that it may connect with a network 30 through the gateway unit which changes the protocol of ECHONET, and protocols, such as TCP/IP, into it since it is not necessary to necessarily mount protocols, such as TCP/IP, in each device.

[0092] (Configuration) In the household-electric-appliances control system concerning the 2nd operation gestalt of this invention, as shown, for example in drawing 6 , it has the network 80 instead of the network 20 in above-mentioned drawing 1 . In this network 80, it differs in the above-mentioned network 20, and communicates with the original protocol of ECHONET.

[0093] Unlike the 1st above-mentioned operation gestalt, the IP address is not assigned to the air conditioner 22 and the hot-water supply management equipment 23 which are connected to this network 80. In addition, household electric appliances ID are assigned to each devices 22, 23, and 89 as a value of a proper like the 1st above-mentioned operation gestalt.

[0094] For this reason, in this network 80, it has the gateway unit 89 which changes the protocol (ECHONET) used in the network 80 instead of above-mentioned router equipment 29, and the protocol (TCP/IP) used in the network 30.

[0095] This gateway unit 89 is equipped with communication link I/F891 for connecting with a network 30, ECHONET I/F892 for connecting with an air conditioner 22 and hot-water supply management equipment 23 grade through the wireless circuit 21 which constitutes a network 80, and the protocol conversion section 893 that performs protocol conversion. This gateway unit relays the message of addressing containing the household electric appliances ID from for example, a household-electric-appliances device etc. to household-electric-appliances server equipment 40 etc. between a network 80 and a network 30. Solution of a DNS name and

protocol conversion for message junction are carried out, and, specifically, the communication link between household-electric-appliances server equipment 40 and the household-electric-appliances device of air-conditioner 22 grade is relayed.

[0096] In ECHONET used in the network 80, data are transmitted and received in a packet (ECHONET packet) unit as shown in drawing 7. This ECHONET packet consists of a part for a header unit (ECHONET header), and a payload part (ECHONET data).

[0097] The information (destination ECHONET address) for identifying the device of a transmission place, the information (source echo network address) for identifying the device of a transmitting agency, etc. are stored in the ECHONET header. Each address is expressed with the ECHONET address assigned for every device in ECHONET.

[0098] Moreover, the destination URI (Unified Resource Identifier) of the message which I have transmitted to household-electric-appliances server equipment 40 by the information (transmitting agency object) which shows the object in the device of a transmitting agency, the information (transmission place object) which shows the object in the device of a transmission place, the property, service, and the gateway unit 89, the transfer parameter of a body, etc. are stored in the ECHONET data.

[0099] In ECHONET, a communications partner is specified by the ECHONET address assigned to each device and the object which shows the function in each device. For example, in the air conditioner 22, objects which acquire a room temperature, for example, such as acquisition/modification of an object and laying temperature, are specified. The junction object which receives the demand of junction to a network 30 is prescribed by the gateway unit 89. The junction object which requires junction is prescribed to the junction object of a gateway unit 89 by the household-electric-appliances device with the need of requiring the junction addressed to network 30 from this gateway unit 89.

[0100] In addition, as for this drawing 7, the IP address shows the example of the ECHONET packet which transmits to addressing to a junction object of a gateway unit 89 to transmit the below-mentioned polling demand to addressing to URI whose directory name is "/kaden" by "Z" (household-electric-appliances server equipment 40).

[0101] Moreover, the TCP/IP packet used in the network 30 consists of a header and a payload, as shown in drawing 8.

[0102] The IP address (destination IP address) of the device of a transmission place, the IP address (source IP address) of the device of a transmitting agency, the port number of a transmission place, etc. are stored in the header. Moreover, the message of addressing to HTTPd42a for example, is stored in a payload.

[0103] In addition, this drawing 8 shows the example of the packet which a gateway unit 89 transmits to household-electric-appliances server equipment 40 according to the ECHONET packet (packet of polling) shown in above-mentioned drawing 7.

[0104] - the junction of a packet -- in order to perform conversion with the above ECHONET packets and a TCP/IP packet, the protocol conversion section 893 of a gateway unit 89 is equipped with the TCP/IP packet transceiver section 301 which transmits and receives a TCP/IP packet, the ECHONET packet transceiver section 302 which performs transmission and reception of the ECHONET packet, and the packet transducer 303 which performs conversion of a packet as shown in drawing 9. This ECHONET packet transceiver section 302 or the packet transducer 303 is equivalent to an above-mentioned junction object.

[0105] In this household-electric-appliances control system, the communication link to the household-electric-appliances device connected to the network 20 is performed like the 1st above-mentioned operation gestalt according to the HTTP protocol which is a higher-level protocol on a TCP/IP protocol from household-electric-appliances server equipment 40.

[0106] For this reason, the correspondence table attaching part 310 holding a table for the packet transducer 303 to perform conversion of a HTTP packet and the ECHONET packet, The status line header extract section 311 which extracts a status line header from the header of the HTTP packet from the household-electric-appliances server equipment 40 supplied from the TCP/IP packet transceiver section 301, The transfer electrical-parameter-extraction section 312 which extracts a transfer parameter from the payload of a HTTP packet, It has the transfer parameter insertion section 313 which inserts a transfer parameter in the ECHONET packet, and the echo packet

formation section 314 which forms an echo packet and is supplied to the ECHONET packet transceiver section 302.

[0107] Moreover, this packet transducer 303 is equipped with the URI extract section 321 which extracts the destination URI from above-mentioned echo packet data, the transfer electrical-parameter-extraction section 322 which extracts a transfer parameter from echo packet data, the transfer parameter insertion section 323 which inserts a transfer parameter in a HTTP packet, and the HTTP packet formation section 324 which forms the HTTP packet addressed to household-electric-appliances server equipment 40.

[0108] As shown in drawing 1010, the correspondence table for conversion of a HTTP packet and the ECHONET packet is stored in the correspondence table attaching part 310.

[0109] The correspondence table showing the correspondence relation between the command by the above-mentioned ECHONET packet and the command (for example, the HTTP command to HTTPd42a) by the HTTP packet is held at the correspondence table attaching part 310. By referring to this correspondence table, the correspondence relation between the commands and the HTTP commands by the ECHONET packet can be known.

[0110] Specifically, the ECHONET address (for example, ECHONET address of an air conditioner 22 [E1]) of the household-electric-appliances device which performs the destination URI (for example, directory of HTTPd42a of an IP address [Z] and the address concerned [/kaden]) in the ECHONET data, URI, and a communication link concerned is matched and stored in this correspondence table.

[0111] In this household-electric-appliances control system, the protocol conversion between a network 80 and a network 30 is possible by the gateway unit 89 of such a configuration. 1 to 1 (end to end) can be communicated now between the application levels currently performed by this by the household-electric-appliances device connected with household-electric-appliances server equipment 40 in the network 80. In addition, a code may be applied to this communication link in the form of end to end in this case. It becomes possible to communicate arbitration between household-electric-appliances server equipment and a household-electric-appliances device, without being known by the gateway unit by doing in this way.

[0112] - It is at polling and the time and conversion of a network 80 and the packet between network 30 is attained as mentioned above. Thereby, from the air conditioner 22 connected to the network 80, and hot-water supply management equipment 23, URI of household-electric-appliances server equipment 40 is specified, and a communication link can be started now. However, from the household-electric-appliances server equipment 40 side, the household-electric-appliances device of air-conditioner 22 grade connected through the gateway unit 89 cannot be specified directly, and a communication link cannot be started. Because, a household-electric-appliances device is because it is not set up so that the communication link by IP can be performed between direct household-electric-appliances server equipment.

[0113] For this reason, in this household-electric-appliances control system, transmission is started to household-electric-appliances server equipment 40 for every predetermined time interval from the household-electric-appliances device side which receives offer of remote-control service. The send action for such every predetermined spacing is called polling. If there is a response from the household-electric-appliances server equipment 40 to polling, the reception concerned will be received, but the household-electric-appliances device which polled stands by till the time of day which should carry out the next polling, when there is no response into predetermined time (when the control command from a household-electric-appliances server etc. is not carried in the packet which is answerback of this polling etc.).

[0114] if household-electric-appliances server equipment 40 does not have the need for transmission over a household-electric-appliances device -- polling -- ignoring (null -- you answering) -- if there is the need for transmission over the household-electric-appliances device concerned, transmission will be started as a response to polling.

[0115] In this household-electric-appliances control system, such polling processing has realized initiation of the communication link from the household-electric-appliances server equipment 40 side substantially.

[0116] In addition, about this polling period, the default is defined and modification may be possible by control from household-electric-appliances server equipment about this value at any value.

[0117] - Customer's DB configuration and household-electric-appliances server equipment 40 In order to realize



offer of the service under the environment where a household-electric-appliances device with the need of performing such polling processing, and the household-electric-appliances device which can perform direct communication with a TCP/IP protocol are intermingled For example, as shown in drawing 11 R> 1, the information which shows whether the direct communication by TCP/IP is possible or there is any need for polling processing is held as access which shows the correspondence procedure to each household-electric-appliances device in the correspondence table in customer DB43a. When the direct communication by TCP/IP is possible, the information [IPv4, IPv6] which shows the version of TCP/IP is held as access, and when polling processing is required, the information which shows that, and the information [every 30 seconds] which shows spacing of [polling from a device] and polling are held.

[0118] Moreover, when the communication link by TCP/IP is possible, an IP address (for example, IP address of TV equipment 12 [X]) is held as the address, but the ECHONET address is held when polling processing is required. In addition, although the ECHONET address of a household-electric-appliances device is unknown before polling, when there is polling, the ECHONET address defined in the payload of the TCP/IP packet of the polling concerned is extracted, and it is stored as the address.

[0119] Moreover, the access approach to home gateway equipment and router equipment which perform junction of the above-mentioned polling etc., and the information about that address or a name may also be indicated by this customer DB. Of course, this home gateway equipment itself has household electric appliances ID, and these may register with Customer DB.

[0120] (Actuation)

(1) supply of the program over a household-electric-appliances device — the actuation at the time of applying for offer of service to household-electric-appliances server equipment 40 in the household-electric-appliances control system constituted as mentioned above For example, although processing (S31-S36) until a user operates TV equipment 12, applies for offer of service and transmits an Acknowledgement to the Acknowledgement from the household-electric-appliances server equipment 40 to this is the same as that even of S1-S6 in above-mentioned drawing 4 as shown in drawing 12 Next processings differ.

[0121] HTTPd42a which received the Acknowledgement from TV equipment 12 checks customer DB43a shown in above-mentioned drawing 11 , and acquires the access approach for the air conditioner 22 which is the candidate for offer of service. Thereby, HTTPd42a gets to know that polling processing needs the communication link to an air conditioner 22, it generates the message (powering-on directions) which directs the injection of the power source of the air conditioner 22 concerned, and the connection to a network 80 to a user so that it may make the polling from the air conditioner 22 concerned start, and it transmits to TV equipment 12 (S37). TV equipment 12 will display on a display 125 the image which directs the injection of the power source of an air conditioner 22 etc. to a user, if such powering-on directions are received (S38).

[0122] This image will be urged to the connection to powering on and the network 80 of an air conditioner 22 at a user, if the contents "turn on the electric power switch of an air conditioner and change into the condition that network connection (Internet connectivity) is made (also switch on the power source of a gateway unit if )" are shown and such an image is displayed on the display 125 of TV equipment 12.

[0123] A user switches on the power source of an air conditioner 22 according to this, and if he is required, he will connect an air conditioner 22 to a network 80 (S39).

[0124] According to this, the power source of an air conditioner 22 starts (S40), and a setup of ECHONET of the air conditioner 22 concerned is initialized, for example, the ECHONET address is determined (S41).

[0125] Then, an air conditioner 22 searches the nodes (other household-electric-appliances devices etc.) which have a "network junction function" from on a network 80. The demand of the notice of an attribute is specifically advanced in order to the nodes (other household-electric-appliances devices etc.) connected to the network 80, and a node (in this case, gateway unit 89) with a "network junction function" is detected. Then, the notice of that attribute is required from the detected node 89, i.e., the gateway unit, (S42), and the response (notice of an attribute) to this is supplied to an air conditioner 22 (S43). If a gateway unit 89 gets to know having the junction function (network junction function) to a network 30 by this, the ECHONET packet which requires that an air conditioner 22 should relay the message of above-mentioned polling to household-electric-appliances server equipment 40 will be transmitted to a gateway unit 89 (S44). This packet is relayed by the gateway unit 89 and

transmitted to household-electric-appliances server equipment 40 as a TCP/IP packet (for example, HTTP packet to HTTPd42a) (S45).

[0126] Specifically as a TCP/IP packet of this polling, the packet of the POST method specified, for example in the protocol of HTTP is used. In this packet, MIME types, such as a predetermined mold, for example, "X-echonet-gateway" etc., are specified as a message of addressing to household-electric-appliances server equipment 40 which transmits. The household-electric-appliances server equipment 40 which received such a packet by this can know that the packet concerned is a command from the ECHONET node (in this case, gateway unit 89). Moreover, in the message, the value of the household electric appliances ID of the household-electric-appliances device of a transmitting agency is included, and household-electric-appliances server equipment 40 can know now the information about the thing from which household-electric-appliances device (node with household electric appliances ID) the packet of the polling which received is.

[0127] According to the above polling, HTTPd42a performs processing of authentication of an air conditioner 22, exchange of a key, etc., supply of the program which receives remote control to an air conditioner 22, etc. like S7-S8 in above-mentioned drawing 4 (S46-S50). Under the present circumstances, conversion of a protocol is performed by the gateway unit 89 and junction of a packet is performed (S47, S50).

[0128] The program which realizes by this actuation whose air conditioner 22 receives remote control will be stored in the memory with which the control section 225 of an air conditioner 22 is equipped, and will be in a running state (S51).

[0129] It is in this condition, for example, if the command of remote control is supplied to air-conditioner 22 from household-electric-appliances server equipment 40, an air conditioner 22 will be in the condition that actuation can be controlled according to the command concerned.

[0130] If offer of a program is successful, DB engine 42b will change from "no" the information in customer DB43a corresponding to the household-electric-appliances device which offered the program (remote-control propriety) into "it is good."

[0131] (2) Use of service (remote control)

As mentioned above, if the program for receiving the remote-control service from household-electric-appliances server equipment 40 will be in a running state, an air conditioner 22 will be in the condition of supervising the input of household-electric-appliances server equipment 40 to a directive command other than the directions input from the input section 222.

[0132] Although a user can use remote-control service even if he uses any of a terminal unit 50 or personal digital assistant equipment 70, he explains the case where personal digital assistant equipment 70 is used, by the following explanation.

[0133] In this household-electric-appliances control system, as shown, for example in drawing 13, processing to transmission (S64) of the Request to Send (S61) of a household-electric-appliances control page to authentication and key exchange of personal digital assistant equipment 70 (S60), and HTTPd42a, offer (S62) of a household-electric-appliances control page, a directions input (S63), and a setting demand as well as processings from S11 to S15 in above-mentioned drawing 5 is performed.

[0134] Then, DB engine 42b acquires the information on the access approach (access in drawing 11) from the correspondence table in customer DB43a to the air conditioner 22 of the user concerned, the address, etc.

[0135] In this case, since polling processing is required for the communication link to an air conditioner 22, it stands by until protocol conversion of the polling packet (S65) from an air conditioner 22 is carried out (S66) and HTTPd42a is offered (S66). If a polling packet is supplied, HTTPd42a will transmit the temperature setting demand addressed to air-conditioner 22 to a gateway unit 89 as a response to this packet (S68). This temperature setting demand is relayed by the gateway unit 89 (S69), and is supplied to an air conditioner 22 (S70).

[0136] The control section 225 of an air conditioner 22 changes laying temperature according to the temperature setting demand supplied from household-electric-appliances server equipment 40 (S71).

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[Translation done.]

**\* NOTICES \***

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, since the communications protocol unified by all household-electric-appliances devices as mentioned above is not established, the communications protocol which can be used by the household-electric-appliances device varies with the environment where the household-electric-appliances device concerned is installed.

[0007] Moreover, it was difficult from viewpoints, such as constraint of cost, to mount the program corresponding to all communications protocols in each household-electric-appliances device beforehand so that it could respond to all installation environments.

[0008] This invention is made in view of an above-mentioned technical problem, and aims at offering the household-electric-appliances device which can realize easily management from the remote place of the household-electric-appliances device by which installation environments differ, household-electric-appliances server equipment, a gateway unit, and a household-electric-appliances control system.

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[Translation done.]

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**MEANS**

[Means for Solving the Problem] In order to solve an above-mentioned problem, the household-electric-appliances device concerning claim 1 of this invention It is the household-electric-appliances device which applies for use of service to the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that it might belong to two or more categories and there might be no duplication between household-electric-appliances server equipment and the household-electric-appliances device which can perform a communication link, The means of communications which performs a communication link with household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-electric-appliances device It holds for every owner and is characterized by having a service request means to transmit the offer demand of service to the household-electric-appliances device (2nd household-electric-appliances device) of the identification information of the household-electric-appliances device (1st household-electric-appliances device) concerned, and the owner of the household-electric-appliances device concerned to the household-electric-appliances server equipment which manages offer of service for every owner.

[0010] Moreover, the household-electric-appliances device concerning claim 4 of this invention is a household-electric-appliances device using the service offered from the household-electric-appliances server equipment which offers service through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that it might belong to two or more categories and there might be no duplication between household-electric-appliances server equipment and the household-electric-appliances device which can perform a communication link, The means of communications which performs a communication link with household-electric-appliances server equipment through an in-house network or a public network, The identification information of the same owner's household-electric-appliances device It holds for every owner. Offer of service to every owner The household-electric-appliances server equipment to manage a service request Starting of the service use software beforehand built into the service use software transmitted according to the offer demand of service to the identification information of the household-electric-appliances device which the household-electric-appliances device (1st household-electric-appliances device) to transmit transmitted, and the household-electric-appliances device (2nd household-electric-appliances device) concerned, or the household-electric-appliances device concerned It is characterized by having a receiving means to receive the command to direct through means of communications, and a service use means to perform the service use software concerned according to the service use software or the command which received, and to receive offer of the service from a household-electric-appliances server.

[0011] A household-electric-appliances device means the electronic equipment used at a home etc., for example, the so-called audiovisual equipments, such as a TV apparatus besides power system household-electric-appliances device \*\*\*\*\* white-home-appliances devices, such as an air conditioner, hot-water supply management equipment, a lighting system, a washing machine, a refrigerator, and a microwave oven, image transcription equipment, and sound equipment, are contained.

[0012] Moreover, the household-electric-appliances server equipment concerning claim 12 of this invention It is household-electric-appliances server equipment which offers the service to a household-electric-appliances

device through a public network. An identification information maintenance means to hold the identification information of the proper beforehand assigned so that there might be no duplication between the household-electric-appliances devices which belong to two or more categories and can perform household-electric-appliances server equipment and a communication link concerned for every owner, The identification information concerned of the 1st household-electric-appliances device transmitted from the household-electric-appliances device (1st household-electric-appliances device) which requires use of service, A receiving means to receive the use demand of service including the information which shows the household-electric-appliances device (2nd household-electric-appliances device) using service, A check means to check whether the household-electric-appliances device corresponding to the information which shows the 2nd household-electric-appliances device which the owner corresponding to the identification information of the 1st household-electric-appliances device which received received is owned with reference to an identification information maintenance means, When it is checked that the owner corresponding to the use demand of service in a check means owns the 2nd household-electric-appliances device, starting of the service use software beforehand built into addressing to a household-electric-appliances device of the 2nd by service use software or the household-electric-appliances device concerned It is characterized by having a transmitting means to transmit the command to direct.

[0013] Moreover, the repeating installation concerning claim 22 of this invention They are the in-house network to which the household-electric-appliances device using the service which the household-electric-appliances server equipment connected via the public network offers was connected, and the repeating installation installed between said household-electric-appliances server equipment. The effective address (local address) is assigned to the household-electric-appliances device only within the in-house network. A receiving means to receive the junction demand which has the information which shows the address or the address of household-electric-appliances server equipment received from household-electric-appliances equipment through the in-house network, It is characterized by having a transmitting means to perform transmission to household-electric-appliances server equipment through a public network, according to the information which shows the address or the address of household-electric-appliances server equipment under junction demand which received.

[0014]

[Embodiment of the Invention] This invention is applicable to the household-electric-appliances control system which manages for example, a household-electric-appliances device collectively.

[0015] The household-electric-appliances control system concerning the 1st operation gestalt which applied the 1st operation gestalt (configuration) this invention For example, the 1st 10 and the private network of the 2nd network 20 grade which were installed in the building 1 as shown in drawing 1 , The household-electric-appliances server equipment 40 and the terminal unit 50 which were connected through these networks 10 and 20 and the 3rd network (public networks, such as the Internet) 30 of the building 1 exterior, It has personal digital assistant equipment 70 connected to a network 30 through a base station 65 and a gateway unit 60.

[0016] The 1st network 10 is a network where the household-electric-appliances device of for example, an acoustic-imaging (AV:Audio Visual) system is connected, for example, consists of a cable network using protocols, such as IEEE1394, as the physical layer. This network 10 is equipped with the image transcription equipment 13 which performs record/playback of image information using record media, such as the television receiver (TV equipment) 12 connected through the wire circuit 11, a magnetic tape, a magnetic disk, and an optical disk, the sound equipment 14 which performs record/playback of speech information, such as music, using record media, such as a magnetic tape, a magnetic disk, an optical disk, and memory, and the router equipment 19 which perform protocol conversion of the physical layer of a wire circuit 11 and a network 30, path control, etc.

[0017] TV equipment 12 For example, communication link I/F121 which performs the communication link with a wire circuit 11, For example, the input section 122 which inputs the directions from a user through remote control, the switch formed in the body, The receive section 123 which receives broadcast of an image, data, etc., and the web browser 124 which acquires the contents offered by HTTPd42a, It has the display 125 which displays the image in which the demand of directions to the image or user whom the receive section received is shown, the control section 126 which controls actuation of the whole equipment, and the household-electric-appliances ID attaching part 129 which holds the household electric appliances ID of a proper for each device of every.

[0018] This TV equipment 12 can use now application service of the service offered by the service (for example,

contents distribution) offered by household-electric-appliances server equipment 40, or the household-electric-appliances server equipment 40 concerned.

[0019] Router equipment 19 is equipped with communication link I/F291 which performs the communication link with a network 30, communication link I/F292 which performs the communication link with a network 10, and the routing control section 193 which performs processing of path control etc.

[0020] Moreover, the 2nd network 20 is a network where the household-electric-appliances device \*\*\*\*\* white-home-appliances device of for example, a power system is connected, for example, consists of a wireless network using the radio protocol as the physical layer. This network 20 is equipped with the router equipment 29 which performs path control of the air conditioner 22 connected through the wireless circuit 21, hot-water supply management equipment 23, a refrigerator 24, a microwave oven 25 (not shown [ a part ]), and the wireless circuit 21 and a network 30 etc. In addition, this network 20 is not restricted to this wireless network, for example, is good also as a cable network using the power line etc. as a channel etc.

[0021] An air conditioner 22 For example, radio I/F221 which performs the communication link with router equipment 29 through the wireless circuit 21, For example, the input section 222 which inputs the directions from a user through remote control, the switch formed in the body, For example, radio I/F223 which performs above-mentioned router equipment 29 and radio using infrared radiation, IEEE802.11, or Bluetooth (trademark), With the temperature sensor 224 which measures a room temperature, for example, the exterior unit control section 225 which controls the exterior unit which has a compressor, a heat exchange machine, etc., It has the control section 226 which controls actuation of exterior unit control-section 225 grade according to the directions supplied through household-electric-appliances server equipment 40, and the household-electric-appliances ID attaching part 229 which holds the household electric appliances ID of a proper for each device of every.

[0022] Hot-water supply management equipment 23 is equipped with router equipment 29, communication link I/F231 which performs a communication link, the display 232 which has the display screen, the input section 233 which inputs the directions from a user, and a display 232 and the control section 234 which controls input section 233 grade through the wireless circuit 21.

[0023] The refrigerator 24 is equipped with router equipment 29, communication link I/F241 which performs a communication link, the display 242 which has the display screen, the input section 243 which inputs the directions from a user, and a display 242 and the control section 244 which controls input section 243 grade through the wireless circuit 21.

[0024] The microwave oven 25 is equipped with router equipment 29, communication link I/F251 which performs a communication link, the display 252 which has the display screen, the input section 253 which inputs the directions from a user, and a display 252 and the control section 254 which controls input section 253 grade through the wireless circuit 21.

[0025] Router equipment 29 is equipped with communication link I/F291 which performs the communication link with a network 30, above-mentioned communication link I/F221 and radio I/F292 which performs radio, and the routing control section 293 which performs processing of path control etc.

[0026] A network 30 consists of a network using the optical fiber as transmission lines, such as a network or FTTH which used the metal cable as transmission lines, such as ISDN, CATV, ADSL, and an analog dedicated line, and performs the \*\*\*\*\* communication link for TCP/IP protocols in this network 30, for example. Or you may make it the above networks constitute the part outside a building 1 for the part in the building 1 of the networks 30 using the network of for example, IEEE802.3 grade.

[0027] Household-electric-appliances server equipment 40 consists of an information processor which has auxiliary storage units, such as MPU, memory, and HDD, and processing of control of actuation of the device connected to each above-mentioned networks 10 and 20 etc. is performed. this -- household electric appliances -- a server -- equipment -- 40 -- a communication interface (I/F) -- 41 -- a terminal unit -- 50 -- or -- a personal digital assistant -- equipment -- 70 -- from -- directions -- following -- each -- a network -- ten -- 20 -- connecting -- having -- \*\*\*\*\* -- a device -- control -- etc. -- service -- or -- being concerned -- service -- an application -- service -- etc. -- providing -- service provision -- the section -- 42 -- this -- service provision -- the section -- service -- offer -- a sake -- using -- data -- etc. -- holding -- a database -- (DB --) -- 43 -- having -- \*\*\*\*\* .



[0028] Communication link I/F41 performs communications control for using the service offered by the service provision section 42 by network 30 course etc.

[0029] the HTTP server (HTTPd) 42 which the service provision section 42 makes a front end the web browser which is functioning in TV equipment 12, a terminal unit 50, and 70 grades, and offers service -- it has DB engine 42b which controls access to a and DB43 etc. Moreover, DB43 is equipped with customer DB42a holding the information about each user (customer), and household-electric-appliances DB42b holding information, such as a function about each household-electric-appliances device.

[0030] In addition, although the router equipments 19 and 29 are respectively formed in the network 10 and the network 20 with the above-mentioned configuration, it is good also as a configuration which you may make it form only one router equipment which has communication link I/F corresponding to wire-circuit 11 and wireless circuit 21 each, or subdivides a network 10 or a network 20, and forms three or more router equipments.

[0031] Above-mentioned TV equipment 12, an air conditioner 22, and -- are the so-called "network household electric appliances" which mounted the TCP/IP protocol respectively. The IP address (global address) of the proper which does not have duplication to all the device respectively connected to a network 30 is assigned to these TV equipments 12, an air conditioner 22, and --. Although the version of this IP address may be IPv4 or may be IPv6, it is taken as the IP address of the same version with each household-electric-appliances devices 22 and 23 and the router equipment 29 which are connected to the network 20.

[0032] Moreover, in this household-electric-appliances control system, the identification information (household electric appliances ID) of at least one proper is respectively assigned to all the devices managed with household-electric-appliances server equipment 40. Even if the manufacturers of a device differ, these household electric appliances ID are managed so that there may be no duplication. At the time of manufacture, these household electric appliances ID are embedded at the household-electric-appliances ID attaching part 129,229, and are held so that it cannot change. Furthermore, by approaches, such as encryption, when required, it is held so that household electric appliances ID may not be known directly. Specifically, it can mount as registers in IC chip which constitutes control sections 126 and 226 etc.

[0033] As household electric appliances ID, the MAC (Media Access Control) address of an IP address (global address), Bluetooth-ID, and the EUI64 grade of IEEE1394 can also be used as it is. Since these addresses are managed so that there may be no duplication each whole device essentially, they can be contributed to reduction of the management burden of household electric appliances ID by diverting these as household electric appliances ID. In addition, even if it is the case where other addresses are diverted as household electric appliances ID in this way, these addresses and household electric appliances ID are managed as an independent value which has another semantics logically, and in order that household-electric-appliances server equipment 40 may identify each household-electric-appliances device, they are used.

[0034] In customer DB43a, for example, the information for identifying each user, as shown in drawing 2 (user name), The household electric appliances ID of all the household-electric-appliances devices that information (User Information) and the user concerned own about the user concerned (the household electric appliances ID of possession household electric appliances) The information (classification and part number) which shows the classification and the part number of the household-electric-appliances device concerned, the information which shows the correspondence procedure to the household-electric-appliances device concerned (access:, for example, IPv6, IPv4, etc.), The correspondence table which matches the information (remote-control propriety) which shows the propriety of the address (address) of the possession household-electric-appliances device concerned and remote control of the possession household-electric-appliances device concerned is stored.

[0035] In addition, you may be the value of the name (for example, DNS name) which may be the value of an IP address itself and is assigned to a household-electric-appliances device about the address of said household-electric-appliances device. To be a name, household-electric-appliances server equipment needs to do first the activity which changes the value of this name into an IP address.

[0036] A user name is good also as information which is sufficient for each user if it is the information on a proper, for example, is given to him for convenience on management of a customer number etc.

[0037] The information about a user consists of information which shows liking of the address of the user concerned, a name, age, an occupation, the telephone number, the provider (provider) of network connection



service, an e-mail address, and the user concerned etc., for example. Moreover, you may make it the description approach of the information about a user include all the family's devices by making information of the householder instead of one certain user into representation, and it may register the firm name as an owner about the household-electric-appliances device which a certain firm holds.

[0038] Moreover, the household electric appliances ID of possession household electric appliances are the household electric appliances ID currently held at the above-mentioned household-electric-appliances ID attaching parts 129 and 229. In case a user purchases a household-electric-appliances device, these household electric appliances ID are matched with the name of the user concerned etc., and are inputted into DB engine 42b. In case a user purchases a household-electric-appliances device, the form in which the address, a name, etc. are entered from a dealer etc. is offered, the salesclerk of a dealer etc. inputs the contents which the user filled in through the terminal unit connected to household-electric-appliances server equipment 40 by the network 30 course, and, specifically, the terminal unit concerned supplies the inputted information to DB engine 42b.

[0039] Or the application of use of services, such as remote operation which minded the household-electric-appliances server at the time of this purchase, may be accepted. A user provides with the use application form in which the information which specifies the service used with the address, a name, etc. in this case is written down, and the salesclerk of a dealer etc. supplies the household electric appliances ID of information, such as the address, the name, age, an occupation, the telephone number, an electronic mail, and liking, and the information which shows the service to be used which the user wrote down in the use application form, and the purchased device to DB engine 42b through a terminal unit etc. like \*\*\*\*.

[0040] The information supplied to DB engine 42b as mentioned above is supplied to customer DB43a through DB engine 42b, and information, such as the household electric appliances ID which show the household-electric-appliances device which the user purchased, matches it with the user name of the user concerned, and User Information, and it is recorded on the correspondence table in customer DB43a.

[0041] In addition, entry of each item of a use application form makes only the thing required for offer of service indispensable, and a necessarily unnecessary thing may be taken as a user's arbitration. Moreover, registration of information, such as a user's address and a name, and household electric appliances ID may be the time of applying for use of the service which an after [ purchase ] at-any-time [ not the time of the purchase of a device but ] or household-electric-appliances server offers etc. Although the operator of household-electric-appliances server equipment 40 etc. may be made to input this application into DB43 according to the application form mailed by the telephone or user from a user, a user operates the web browser currently performed with the terminal unit connected to networks 10 and 20 or a network 30, and may be made to input it via HTTPd42a.

[0042] In this customer DB43a, a part of User Information [ at least ], such as every user name, the same user name, and the address, manages the household electric appliances ID of the registered device etc. for every same user. He is trying for all conditions, such as a user name and the address, to manage the information about the household-electric-appliances device which the user concerned owns for every same user in this drawing 2.

[0043] By considering customer DB43a as such a configuration, a list of the household-electric-appliances device which the user concerned owns by using a user name or User Information as a search key can be searched now.

[0044] Moreover, it matches with the household electric appliances ID of each device, and the information which shows the classification (for example, exceptions, such as TV equipment, image transcription equipment, an air conditioner, and hot-water supply management equipment) of a household-electric-appliances device, the manufacturer/part number of a household-electric-appliances device, the date of manufacture, purchase hysteresis, maintenance record, etc. is recorded on this customer DB43a.

[0045] moreover, it is shown in above-mentioned drawing 2 R> 2 at this customer DB43a -- as -- the access approach ("access": -- the information which shows exceptions, such as the approach of networks, such as the Internet, a telephone, or others, --) from a household-electric-appliances server to the household-electric-appliances device concerned [ in drawing 2 ] The information which always shows exceptions, such as the approach of connection, the so-called dial up which sets up connection at the time of the need, or others, The addresses (information which shows the addresses, such as an IP address, the telephone number, and a proxy server, information which shows the access approach) of the household-electric-appliances device concerned match with the household electric appliances ID of each household-electric-appliances device the information

which shows whether address translation etc. may enter on the way, and it is recorded.

[0046] In addition, at the time of the purchase of a household-electric-appliances device, or the application of service, a part of information corresponding to household electric appliances ID can be a blank. For example, in case the IP address of a household-electric-appliances device connects the household-electric-appliances device concerned to a network, in order to set it up, it is thought at the time of purchase that the case of being unknown is common.

[0047] In this case, before offer of service is started, the information on access in above-mentioned drawing 2, the address, etc. is registered. An IP address is assigned to this household-electric-appliances device in case the household-electric-appliances device which the user purchased is specifically connected to the network 20 grade in \*\*. Then, through router equipment 29 grade, the household-electric-appliances device concerned supplies the information which shows the household electric appliances ID of a self-device, the assigned IP addresses (the IPv four address, the IPv6 address, DNS name, etc.), and the access approach to DB engine 42b, and requires registration of it. Each household-electric-appliances device has held the address of household-electric-appliances server equipment 40, the access approach to household-electric-appliances server equipment 40, etc. beforehand, and each household-electric-appliances device supplies household electric appliances ID, an IP address, etc. to household-electric-appliances server equipment 40 according to these.

[0048] Thus, if household electric appliances ID, an IP address, etc. are supplied, DB engine 42b of household-electric-appliances server equipment 40 will register the supplied household electric appliances ID, an IP address, etc. into customer DB43a.

[0049] In addition, although it is not limited to the configuration shown in this drawing 2 and has the same logical structure as this customer DB43a, physically, multiple files etc. distribute, customer DB43a is stored in them, and you may make it constitute it by matching these with a pointer.

[0050] Moreover, as shown in drawing 3, for each household-electric-appliances device of every, an available function is matched with the information (classification, part number) for identifying the household-electric-appliances device here by household-electric-appliances DB43b, and is held at it. Moreover, the image which matches with household electric appliances ID or a product part number, and shows a general view of specifications, such as the information about a household-electric-appliances device, for example, a dimension, and power consumption, or the household-electric-appliances device concerned to this household-electric-appliances DB43b may be stored.

[0051] (Actuation)

(1) It is at supply of the program over a household-electric-appliances device, and the time, and the household-electric-appliances device of above-mentioned TV equipment 12 and air-conditioner 22 grade is constituted so that actuation can be managed according to a communication message with the exterior through communication link I/F121 or radio I/F221 etc. For this reason, household-electric-appliances server equipment 40 can be connected with these devices, and the operating state using the service offered from household-electric-appliances server equipment 40, then the service which the household-electric-appliances server equipments 40, such as remote operation, remote maintenance, or software distribution, offer, for example can be used now.

[0052] With this operation gestalt, since the TCP/IP protocol is mounted in the household-electric-appliances device connected to each networks 10 and 20, if it connects with a network 30 through the router equipments 19 and 29, a communication link can be performed with household-electric-appliances server equipment 40.

[0053] The control section of each household-electric-appliances device has held beforehand information (for example, "server.kaden.co.jp" etc.), such as URL (Unified Resource Locator) which shows the address of the household-electric-appliances server equipment 40 which offers service. Or IP addresses (for example, "Z" etc.) may be held as they are.

[0054] Or you may make it acquire the address of the household-electric-appliances server equipment 40 which offers service from the data which the receive section 123 grade of TV equipment 12 received, for example. It specifically matches with images, such as commercials of a household-electric-appliances device (for example, air conditioner 22) which offer service, and the address of the information for identifying the household-electric-appliances device concerned and the household-electric-appliances server equipment 40 which offers the service to the household-electric-appliances device concerned is supplied.

[0055] Or the address of household-electric-appliances server equipment 40 is acquired, and a user inputs the acquired address for example, through web browser 124 grade, and may be made to supply the household-electric-appliances device which receives offer of the service concerned for the inputted address separately.

[0056] Moreover, in order for a user to actually use the service which household-electric-appliances server equipment 40 offers, it is necessary to change into the condition that the program concerned which offers the program for performing processing for using the service concerned for a household-electric-appliances device, or is beforehand mounted in the household-electric-appliances device can be performed.

[0057] By the way, the demand of offer of service etc. to household-electric-appliances server equipment 40 is performed using the device of the terminal unit 50, the personal digital assistant equipment 70, or the TV equipment 12 grade which has the display function which displays the directions to the input function and user who input the directions from a user etc.

[0058] For example, in receiving offer of service of the remote operation to an air conditioner 22, a user operates TV equipment 12 and demands offer of service of the remote control concerned of household-electric-appliances server equipment 40.

[0059] As shown in drawing 4, a user inputs information, such as the address with an above-mentioned user, and a name, etc. into the application form which the web browser 124 of TV equipment 12 displays on a display 125, and, specifically, the application of remote-control service of an air conditioner 22 is directed (S1). This application form may be beforehand stored in TV equipment 12 like the above-mentioned household electric appliances ID. Or only the URL of the form for which it applies is stored in TV equipment 12, and a web browser 124 applies from the URL concerned, and you may make it acquire form according to the directions from a user.

[0060] If a user inputs the information for identifying the service (in this case, remote control of an air conditioner 22) which requires the information about users, such as the address, a name, etc. which were inputted into application form, household electric appliances ID (in this case, "A" which is the household electric appliances ID of TV equipment 12), and offer etc., a web browser 124 will generate an application message including such information, will encipher this, and will transmit to household-electric-appliances server equipment 40. Specifically, this application message is enciphered and transmitted by procedures, such as SSL (Secure Sockets Layer). The transmitted application message is supplied to household-electric-appliances server equipment 40 through communication link I/F121, router equipment 19, and a network 30 (S2). In addition, the household electric appliances ID of TV equipment 12 may have composition which is automatically passed to household-electric-appliances server equipment 40, even if a user does not input.

[0061] The supplied application message is supplied to DB engine 42b through communication link I/F41 and HTTPd42a. The classification, the part number, etc. of the information (user name) of the user corresponding to [ apply, extract the household electric appliances ID in a message, and / with reference to customer DB43a ] the household electric appliances ID concerned in DB engine 42b to whom DB engine 42b was supplied, and a household-electric-appliances device are acquired (S3). Furthermore, DB engine 42b acquires the information on the image of the household-electric-appliances device concerned etc. from household-electric-appliances DB43b, and supplies it to HTTPd42a. HTTPd42a generates the data of the data (for example, HTML (Hyper Text Markup Language) format or XML(eXtensible) Markup Language) format on which the check screen to the application of offer of service including the definition of the carbon button which inputs display directions of the supplied image data and the check directions from a user etc. is displayed. The generated data are supplied to TV equipment 12 through communication link I/F41 (S4).

[0062] In the data of such a check screen, DB engine 42b may define the display of the purchase hysteresis acquired from customer DB43a, maintenance hysteresis, etc., for example.

[0063] By the way, before creating the data of such a check screen, a function with the available household-electric-appliances device corresponding to the classification and the part number of the household-electric-appliances device which DB engine 42b acquired in above-mentioned S3 with reference to the correspondence table stored in household-electric-appliances DB43b is checked, and you may make it judge whether it is actually available in the service which the user is demanding. In this case, if HTTPd42a has the available service which the user demanded, it will perform processing of S4, but when not available, generates the data in which the purport which is not available is shown separately, and transmits to TV equipment 12.

[0064] By performing such processing, a user can recognize the use propriety of service, can perform demand processing of offer of service again, and can contribute to improvement in operability.

[0065] If the data of the above check screens are supplied, a web browser 124 will display the screen according to the data concerned on a display 125, and will require a check of a user (S5).

[0066] If the user who looked at such a check screen operates the input section 122 and inputs check directions, a web browser 124 will generate the message of an Acknowledgement and will transmit to household-electric-appliances server equipment 40 (S6).

[0067] If such an Acknowledgement is supplied, HTTPd42a transmits a predetermined command to an air conditioner 22, after processing authentication of an air conditioner 22, exchange of a key, etc. by SSL (S7), and after making an air conditioner 22 into the condition of receiving a program, the program which receives remote control will be supplied (S8).

[0068] This program will be supplied to a control section 225 through router equipment 29 and radio 1/F221, will be stored in the memory with which a control section 225 is equipped, and will be in a running state (S9).

[0069] It is in this condition, for example, if the command of remote control is supplied to air-conditioner 22 from household-electric-appliances server equipment 40, an air conditioner 22 will be in the condition that actuation can be controlled according to the command concerned.

[0070] If offer of a program is successful, DB engine 42b will change from "no" the information in customer DB43a corresponding to the household-electric-appliances device which offered the program (remote-control propriety) into "it is good."

[0071] By the way, in this household-electric-appliances control system, direct communication can be carried out now with the relation of end to end (End to End) using the same protocol (for example, TCP/IP) between the air conditioners 22 which receive offer of the TV equipment 12 which requires offer of household-electric-appliances server equipment 40 and service, or service. For this reason, the program which applied through router equipment 19 as mentioned above, supplied the message to household-electric-appliances server equipment 40, and was supplied according to this can be supplied to the air conditioner 22 which receives offer of service as it is through router equipment 29.

[0072] Moreover, in this household-electric-appliances control system, the household electric appliances ID of a proper were held to each household-electric-appliances device, and the household electric appliances ID of the household-electric-appliances device which each user owns are managed. For this reason, in the household-electric-appliances server equipment 40 side, the user corresponding to household electric appliances ID can be specified only by providing the demand of offer of service with household electric appliances ID.

[0073] Moreover, by holding the classification and the part number of the household-electric-appliances device corresponding to household electric appliances ID, and the available function, the available function corresponding to household electric appliances ID can be specified, and it can check at the time of the application of offer of service.

[0074] In addition, although above-mentioned explanation showed the case where a user demanded offer of remote-control service of an air conditioner 22 of household-electric-appliances server equipment 40 using TV equipment 12 As long as it has the display which performs the display to the input section and the user who input the directions from a user, it may be made to require service of household-electric-appliances server equipment 40, for example using other terminal unit or other household-electric-appliances devices of a terminal unit 50 and personal digital assistant equipment 70 grade.

[0075] In above-mentioned explanation, moreover, in an application message The household electric appliances ID of a household-electric-appliances device ("A" which is the household electric appliances ID of TV equipment 12 in an above-mentioned example) which transmit the application message concerned are transmitted. The list of household electric appliances ID of the household-electric-appliances device which the user of the household-electric-appliances device by which household-electric-appliances server equipment 40 transmitted the application message concerned with reference to customer DB43a owns is acquired. Data (for example, data of a HTML format or an XML format) including description of the processing for performing displays corresponding to these household electric appliances ID and these selections are created. A web browser 124 is supplied through HTTPd42a, and you may make it choose household electric appliances ID according to the directions which the

user inputted according to this. Moreover, you may make it specify the household electric appliances ID of the household-electric-appliances device which receives offer of service in an above-mentioned application message. [0076] Moreover, although above-mentioned explanation showed the case where the service whose user receives offer was specified in an above-mentioned application message In the household-electric-appliances device corresponding to the household electric appliances ID to which DB engine 42b was supplied from the TV equipment 12 grade an available function It acquires from the correspondence table currently held at household-electric-appliances DB43b, data including description of the processing which performs displays and these selections of an available function are generated, and it applies for the function directed by the user according to this, and may be made to consider as the target service. Or you may make it check to a user whether it is good with the service which DB engine 42b guessed and guessed that service for an application was according to the function acquired from household-electric-appliances DB43b.

[0077] (2) Use of service (remote control)

As mentioned above, if the program for receiving the remote-control service from household-electric-appliances server equipment 40 will be in a running state, an air conditioner 22 will be in the condition of supervising the input of household-electric-appliances server equipment 40 to a directive command other than the directions input from the input section 222.

[0078] Although a user can use remote-control service even if he uses any of a terminal unit 50 or personal digital assistant equipment 70, he explains the case where personal digital assistant equipment 70 is used, by the following explanation.

[0079] If a user directs use of remote-control service, personal digital assistant equipment 70 will perform log in processing to household-electric-appliances server equipment 40 (S11). In this log in processing, personal digital assistant equipment 70 transmits authentication information to household-electric-appliances server equipment 40. If it checks that authentication information is just, household-electric-appliances server equipment 40 will exchange the key for the encryption communication link by SSL etc. between personal digital assistant equipment 70. moreover, him, such as an input of the user ID and the password which were beforehand assigned to the user if needed, — authentication for a check may be performed.

[0080] After exchange of a key is completed, the web browser 74 of personal digital assistant equipment 70 requires transmission of the data (household-electric-appliances control page) for directing remote control of an air conditioner 22 from HTTPd42a (S12).

[0081] HTTPd42a supplies the data with which the selection input of the input column or command which inputs a command etc. was defined to a web browser 74 as data of a household-electric-appliances control page to such a demand (S13).

[0082] If such data are supplied, a web browser 74 will display the image according to the data concerned on a display 73. The display to which the input of the temperature set up, for example is urged in this image is included. If a user requires that the key of "2" and "5" prepared in the input section 72 should be pressed, and laying temperature should be made into 25 degrees C from this image (S14) The message of the purport which makes laying temperature of an air conditioner 22 25 degrees C is generated by the web browser 74, and transmits the message (temperature setting demand) concerned to household-electric-appliances server equipment 40 (S15).

[0083] If such a temperature setting demand is received, DB engine 42b will acquire the information on the access approach (access in drawing 2 R> 2) from the correspondence table in customer DB43a to the air conditioner 22 of the user concerned, the address, etc. The service provision section 42 performs authentication processing and the message exchange of a key between air conditioners 22 by the acquired access approach (S16).

[0084] If these processings are successful, the service provision section 42 will encipher the temperature setting demand from the above-mentioned web browser 74, will attach a digital signature, and will supply it to an air conditioner 22 (S17).

[0085] The signature of the supplied temperature setting demand checks a control section 225, if just, a temperature setting demand will be decrypted (S18), and it will interpret and execute the decrypted command (S19).

[0086] Furthermore, when such remote control is successful, a control section 225 generates the information which shows that, it transmits to household-electric-appliances server equipment 40 (S20), household-electric-

appliances server equipment 40 transmits this to personal digital assistant equipment 70 (S21), and you may make it notify the purport that remote control was successful with the display 73 (S22).

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[Translation done.]



**JPO and NCIP are not responsible for any damages caused by the use of this translation.**

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

[Drawing 2]

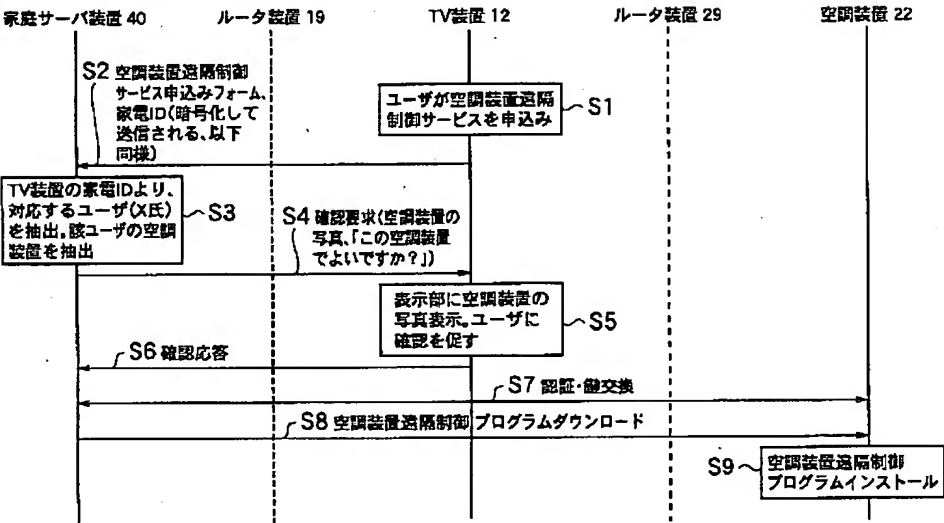
ユーザ名	ユーザ情報	所有家電 の家電ID	種別・型番	製造年月日	購入履歴	メンテナンス 記録	アクセス	アドレス 又はネーム	遠隔制御 可否
X	住所、 氏名、 年齢、 職業、 電話番号、 プロバイダ、 電子メール アドレス、 好み、	A	TV装置 XYZ-012	...	...	...	IPv6	X	可
		B	空調装置 ABC-123	...	...	...	IPv6	Y	可
		C	ルータ装置 DEF-123	...	...	...	IPv6	V	否
		D	ルータ装置 DEF-456	...	...	...	IPv6	W	否
		...	...	...	...	...	...	...	...
Y	住所、 氏名、 年齢、 ...	YA	TV装置 XYZ-013	...	...	...	IPv4	YA	可
		YB	...	...	...	...	...	...	...

[http://www4.ipdl.ncipi.go.jp/cgi-bin/tran\\_web/cgi\\_ejje](http://www4.ipdl.ncipi.go.jp/cgi-bin/tran_web/cgi_ejje)

43b

(遠隔制御)					
種別	型番	機能 A	機能 B	機能 C	・
TV装置	XYZ-001	○	×	×	・
	XYZ-002	○	○	×	・
	XYZ-003	○	○	○	・
	・	・	・	・	・
空調装置	ABC-123	○	×	×	・
	ABC-124	○	○	×	・
	・	・	・	・	・

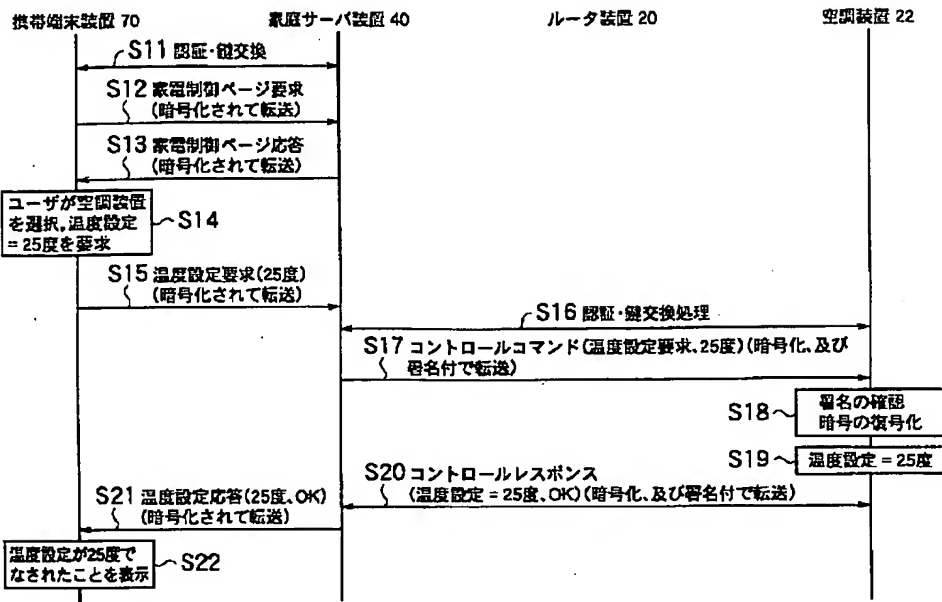
[Drawing 4]



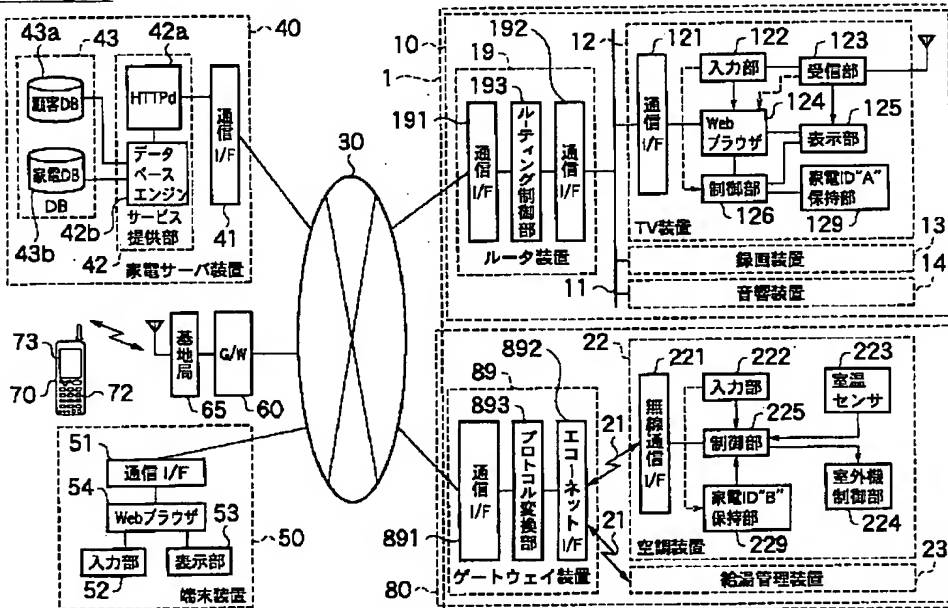
[Drawing 8]

ヘッダ (あて先IPアドレス = Z, ソースIPアドレス = W, ポート番号 = HTTP用)
ペイロード POST/cgi-bin/kaden.cgi HTTP/1.1  Data = 転送パラメータ(暗号化されている): 家電ID = B, ポーリング要求

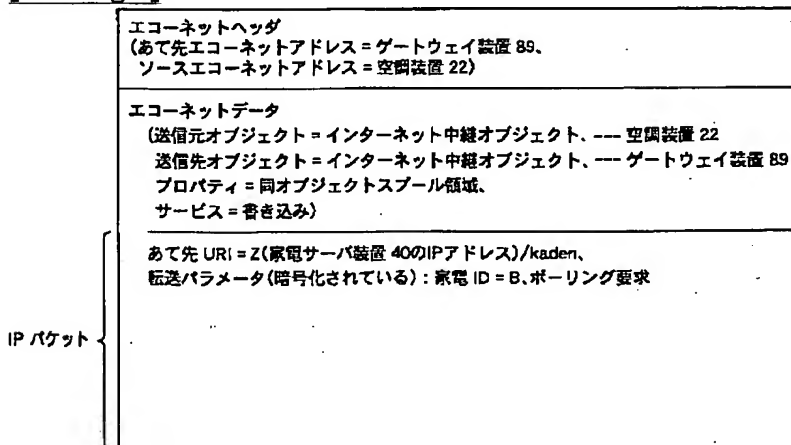
[Drawing 5]



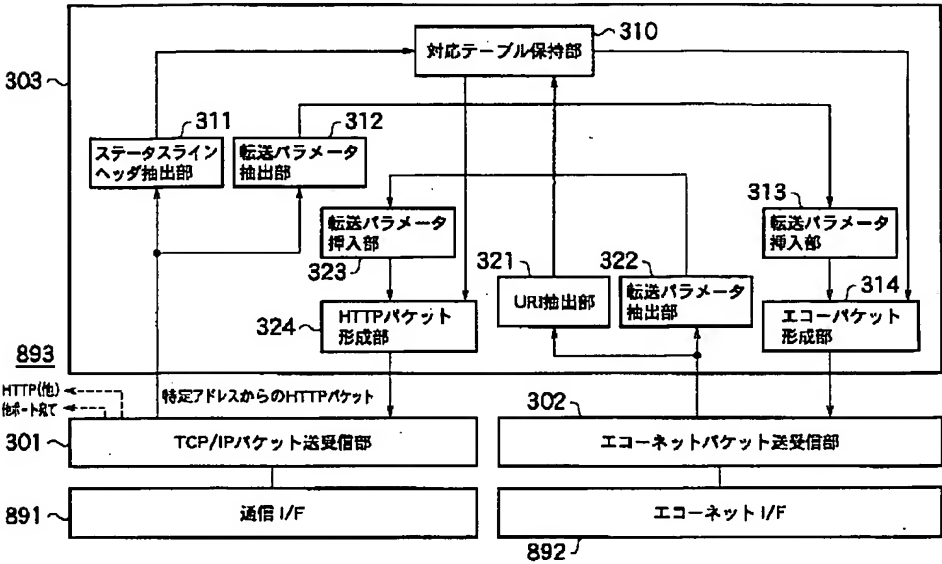
[Drawing 6]



[Drawing 7]



[Drawing 9]  
89



[Drawing 11]  
43a

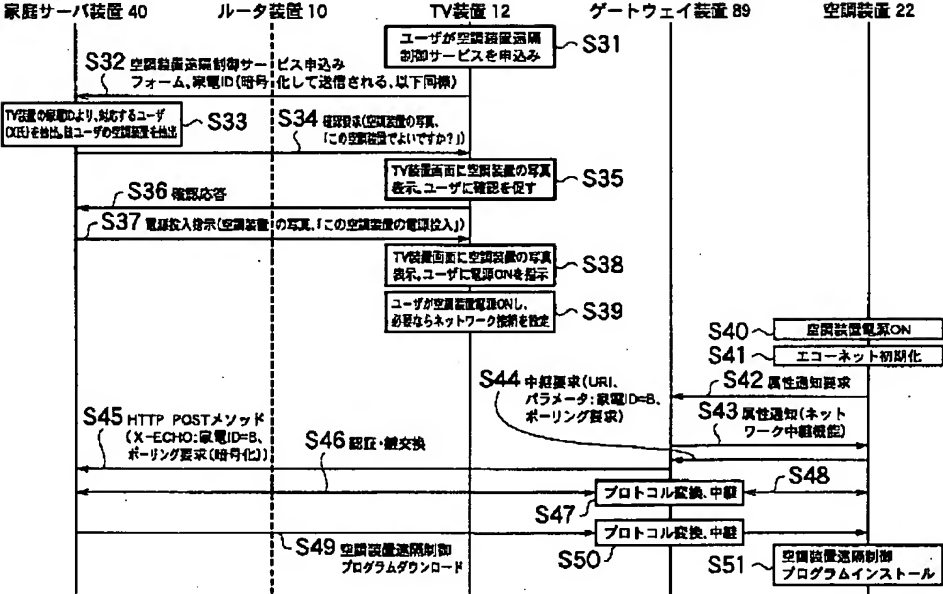
ユーザ名	ユーザ情報	所有家電 の家電ID	種別・型番	アクセス	アドレス	ホームゲートウェイ へのアクセス	アドレス 又はネーム
X	住所、 氏名、 年齢、 職業、 電話番号、 プロバイダ、 電子メール アドレス、 好み、	A	TV装置 XYZ-012	IPv6	X	IPv6	V
		B	空調装置 ABC-789	機器からの ポーリング (30秒毎)	エコーネット アドレス (アドレス未定) → E1	IPv6	W
		C	ルータ装置 DEF-123	IPv6	V	—	—
		D	ホームゲートウェイ DEF-456	IPv6	W	—	—
		...	...	...	...	...	...

[Drawing 10]

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あて先 URI	エコネットアドレス
Z/kaden	E1 (空調装置 22のエコネットアドレス)
...	...

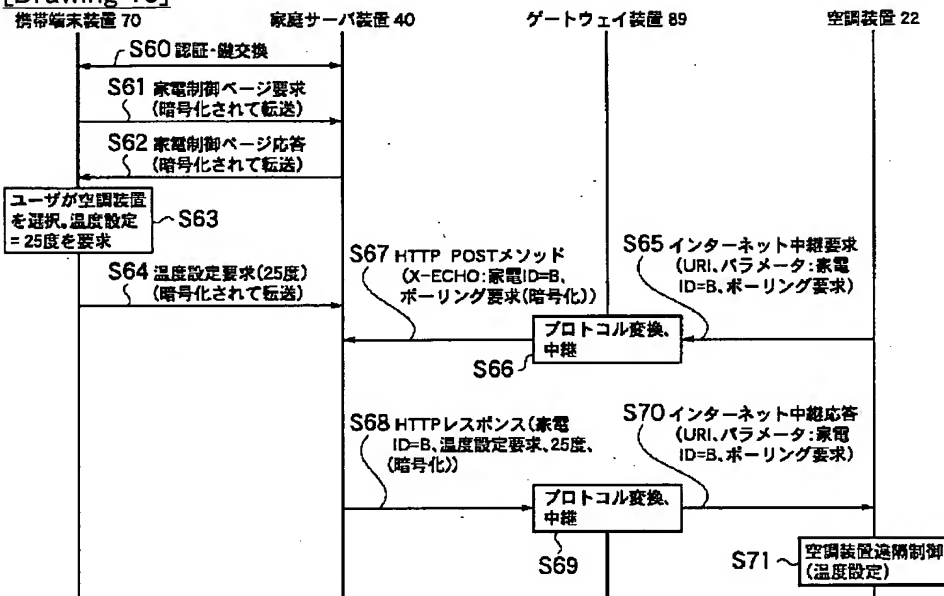
[Drawing 12]



[Drawing 15]

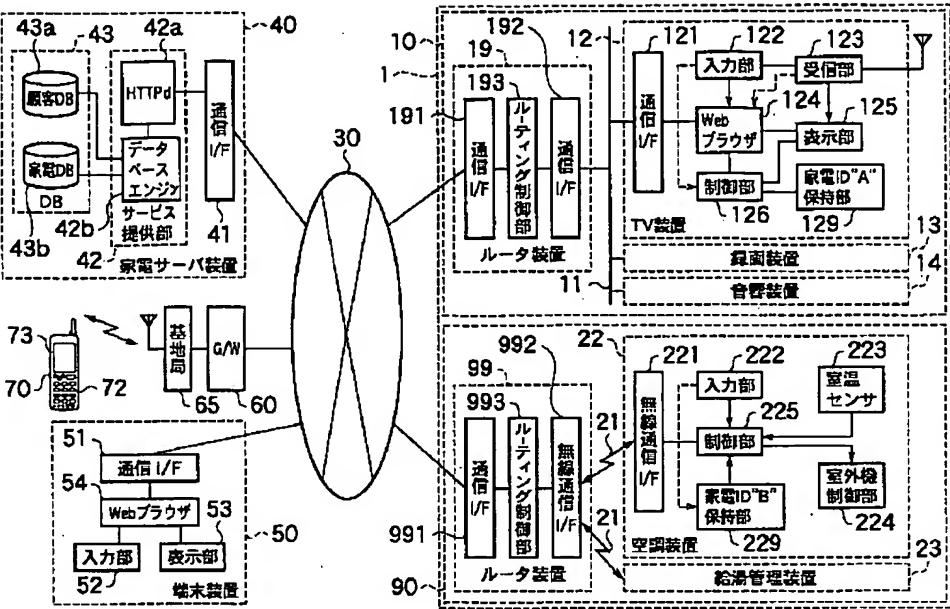
ヘッダ (あて先IPアドレス = Z, ソースIPアドレス = Y, ポート番号 = HTTP用)
ペイロード POST/cgi-bin/kaden.cgi HTTP/1.1  Data = 転送パラメータ(暗号化されている): 家電ID = B, ボーリング要求

[Drawing 13]



[Drawing 14]

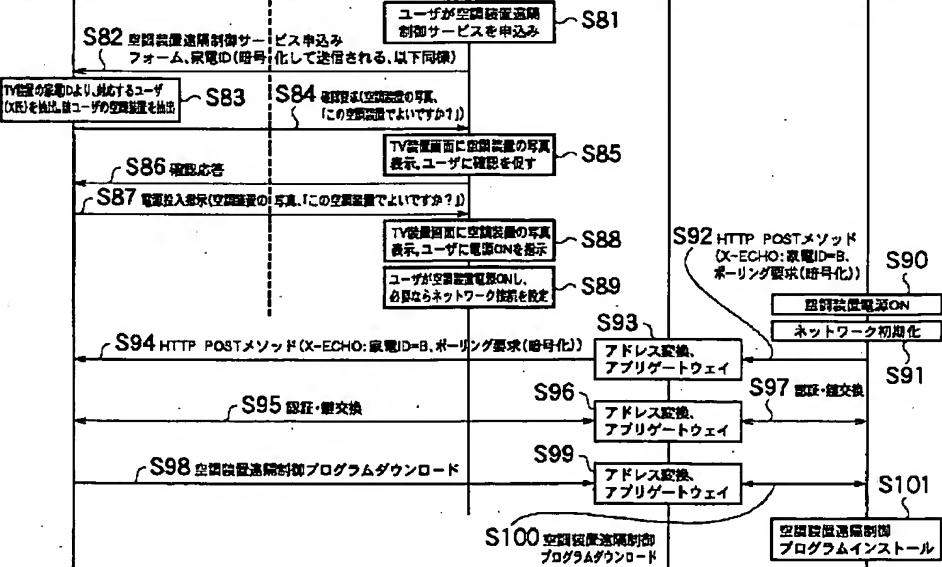




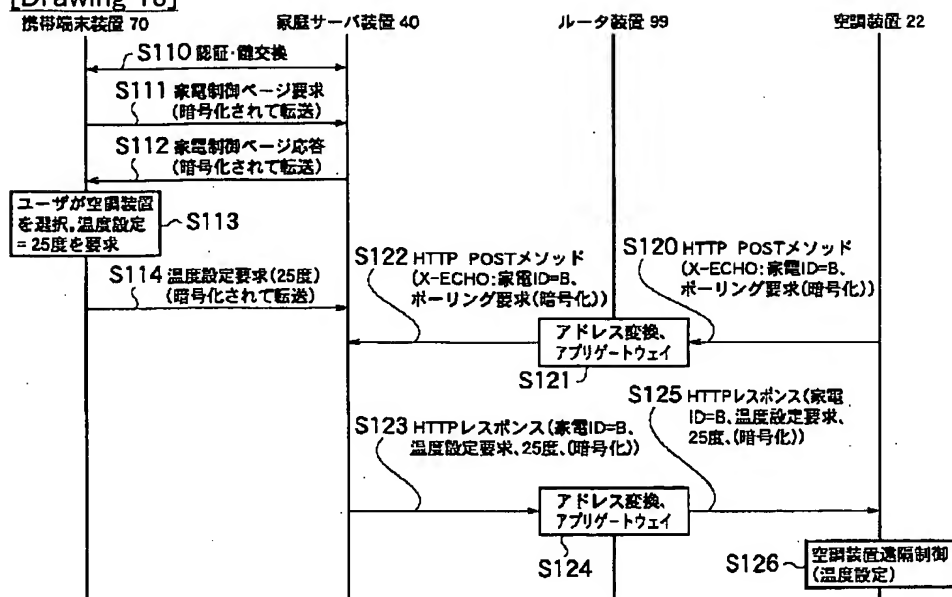
[Drawing 16]  
43a

ユーザ名	ユーザ情報	所有家電の家電ID	種別・型番	アクセス	アドレス	ルータ装置へのアクセス	アドレス又はネーム
X	住所、氏名、年齢、職業、電話番号、プロバイダ、電子メールアドレス、好み、	A	TV装置 XYZ-012	IPv6	X	IPv6	V
		B	空調装置 ABC-789	機器からのポーリング (30秒毎)	到達不可能	IPv6	W
		C	ルータ装置 DEF-123	IPv6	V	—	—
		D	ホームゲートウェイ DEF-456	IPv6	W	—	—
		...	...	...	...	...	...

[Drawing 17]  
家庭サーバ装置 40      ルータ装置 10      TV装置 12      ルータ装置 99      空調装置 22



[Drawing 18]



[Translation done.]

(19) 日本国特許庁 (J P)

## (12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2003-111170

(P2003-111170A)

(43) 公開日 平成15年4月11日 (2003.4.11)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	キーワード* (参考)
H 0 4 Q 9/00	3 2 1 3 0 1	H 0 4 Q 9/00	3 2 1 E 5 B 0 8 5 3 0 1 D 5 B 0 8 9 3 0 1 E 5 K 0 4 8
G 0 6 F 13/00 15/00	3 5 7 3 1 0	G 0 6 F 13/00 15/00	3 5 7 A 5 K 1 0 1 3 1 0 E

審査請求 未請求 請求項の数24 O L (全 24 頁) 最終頁に続く

(21) 出願番号 特願2001-298259(P2001-298259)

(22) 出願日 平成13年9月27日 (2001.9.27)

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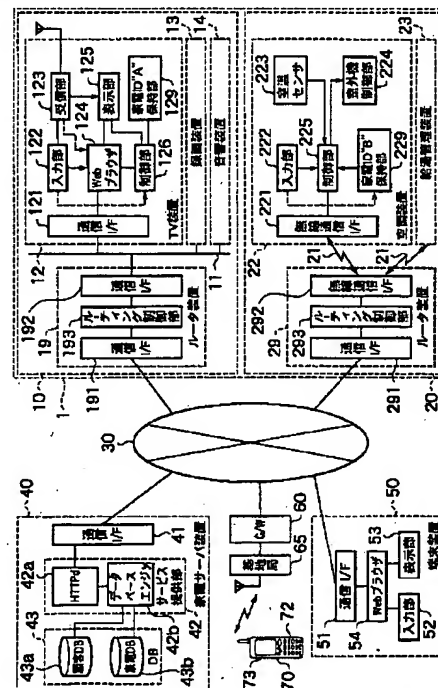
最終頁に続く

(54) 【発明の名称】 家電機器、家電サーバ装置及び中継装置

(57) 【要約】

【課題】 設置環境が異なる家電機器の遠隔地からの管理を容易に実現する。

【解決手段】 ユーザがTV装置12のWebブラウザ124を操作し、サービスの利用を要求すると、サービスの提供を受ける家電機器（空調装置22）の家電IDを含むサービス提供要求がルータ装置19、ネットワーク30を介して家電サーバ装置40に供給される。家電サーバ装置40のHTTPd42aは、これに応じて当該要求されたサービスの提供を受けるための制御プログラムを、家電IDに対応する家電機器（空調装置22）に供給する。



## 【特許請求の範囲】

【請求項1】 公衆ネットワークを介してサービスを提供する家電サーバ装置にサービスの利用を申し込む家電機器であって、

複数のカテゴリに属し、前記家電サーバ装置と通信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を保持する識別情報保持手段と、  
構内ネットワーク又は公衆ネットワークを介して前記家電サーバ装置と通信を行う通信手段と、

同一の所有者の家電機器の識別情報を所有者毎に保持し、所有者毎にサービスの提供を管理する家電サーバ装置に、当該家電機器（第1の家電機器）の識別情報と当該家電機器の所有者の家電機器（第2の家電機器）に対するサービスの提供要求を送信するサービス要求手段とを備えることを特徴とする家電機器。

【請求項2】 前記サービス要求手段は、  
前記第1の家電機器の識別情報又はサービスの提供要求に対して前記家電サーバ装置から供給される前記第2の家電機器に関するデータに応じた画像を表示する確認表示手段と、

該確認表示手段による表示に応じたユーザからの確認入力があった場合に、確認入力があった旨を示す確認情報を、当該確認情報に応じて前記第2の家電機器にサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを送信する前記サーバ装置に送信する確認送信手段とを備えることを特徴とする請求項1記載の家電機器。

【請求項3】 前記サービス要求手段は、  
前記第1の家電機器の識別情報又は前記サービスの提供要求に応じて、前記家電サーバ装置から供給されるユーザに対する、第2の家電機器についての電源入力又はネットワーク接続の指示に応じた画像を表示させる指示表示手段と、

該指示表示手段による表示に応じたユーザからの完了入力があった場合に、完了入力があった旨を示す完了情報を、当該完了情報に応じて前記第2の家電機器に対するサービスの提供を開始する前記サーバ装置に送信する完了送信手段とを備えることを特徴とする請求項1記載の家電機器。

【請求項4】 公衆ネットワークを介してサービスを提供する家電サーバ装置から提供されるサービスを利用する家電機器であって、  
複数のカテゴリに属し、前記家電サーバ装置と通信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を保持する識別情報保持手段と、  
構内ネットワーク又は公衆ネットワークを介して前記家電サーバ装置と通信を行う通信手段と、

同一の所有者の家電機器の識別情報を所有者毎に保持し、所有者毎にサービスの提供を管理する家電サーバ装置が、サービス要求を送信する家電機器（第1の家電機

器）が送信した該家電機器の識別情報と当該家電機器

（第2の家電機器）に対するサービスの提供要求に応じて送信するサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを前記通信手段を介して受信する受信手段と、

前記受信したサービス利用ソフトウェア又はコマンドに応じて当該サービス利用ソフトウェアを実行し、前記家電サーバからのサービスの提供を受けるサービス利用手段とを備えることを特徴とする家電機器。

【請求項5】 前記第1の家電機器と前記第2の家電機器は、各々異なる構内ネットワークに接続されていることを特徴とする請求項1又は請求項4に記載の家電機器。

【請求項6】 前記第1の家電機器が接続されている構内ネットワークと前記第2の家電機器が接続されている構内ネットワークは、各々前記公衆ネットワークとの中継を行う異なるルータ装置を介して前記公衆ネットワークに接続されていることを特徴とする請求項5記載の家電機器。

【請求項7】 前記第1の家電機器及び第2の家電機器には、前記公衆ネットワークに接続される機器毎に固有のアドレス（グローバルアドレス）が割り当てられており、  
前記家電サーバ装置からのパケットが公衆ネットワークを介して直接第2の家電機器に直接到達可能であり、  
前記家電サーバ装置は、前記家電機器の識別情報に対応させて前記アドレス又はネームを保持することを特徴とする請求項1又は請求項4に記載の家電機器。

【請求項8】 前記第2の家電機器には、該第2の家電機器が接続されている前記構内ネットワーク内でのみ有効なアドレス（ローカルアドレス）が割り当てられており、  
前記家電サーバ装置は、前記家電機器の識別情報に対応させて前記ローカルアドレスが割り当てられている旨を示す情報を保持しており、  
前記第2の家電機器と前記家電サーバ装置間の通信は、前記第2の家電機器が、該第2の家電機器が接続されている前記構内ネットワークと前記公衆ネットワークの間に設けられた中継手段に、前記家電サーバ装置のアドレス又はアドレスを示す情報を有する中継要求を送信し、  
該中継装置が中継要求中のアドレス又はアドレスを示す情報に応じて中継を行うことによって行うことを特徴とする請求項1又は請求項4に記載の家電機器。

【請求項9】 前記第2の家電機器には、前記公衆ネットワーク側から到達不可能なアドレス（プライベートアドレス）が割り当てられており、  
前記第2の家電機器と前記家電サーバ装置間の通信は、前記第2の家電機器が、該第2の家電機器と前記家電サーバ装置の間に設けられた中継手段に、前記家電サーバ

装置のアドレス又はアドレスを示す情報を有する中継要求を送信し、該中継装置が中継要求中のアドレス又はアドレスを示す情報に応じて中継を行うことによって行うことを特徴とする請求項 1 又は請求項 4 に記載の家電機器。

【請求項 10】 前記家電サーバ装置から第 2 の家電機器への通信は、所定時間毎の前記第 2 の家電機器から前記家電サーバ装置に対する送信に対する応答として行われることを特徴とする請求項 8 又は請求項 9 に記載の家電機器。

【請求項 11】 前記第 2 の家電機器と前記家電サーバ装置間の通信のプロトコルとして、HTTP (Hyper Text Transfer Protocol) プロトコルを用いることを特徴とする請求項 7 乃至請求項 9 に記載の家電機器。

【請求項 12】 公衆ネットワークを介して家電機器に対するサービスを提供する家電サーバ装置であって、複数のカテゴリに属し、当該家電サーバ装置と通信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を所有者毎に保持する識別情報保持手段と、

サービスの利用を要求する前記家電機器（第 1 の家電機器）から送信された当該第 1 の家電機器の識別情報と、サービスを利用する家電機器（第 2 の家電機器）を示す情報を含むサービスの利用要求を受信する受信手段と、前記識別情報保持手段を参照して、前記受信した前記第 1 の家電機器の識別情報に対応する所有者が前記受信した第 2 の家電機器を示す情報に対応する家電機器を所有しているか否かを確認する確認手段と、

該確認手段が、前記サービスの利用要求に対応する所有者が前記第 2 の家電機器を所有していることを確認した場合に、前記第 2 の家電機器宛てにサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを送信する送信手段とを備えることを特徴とする家電サーバ装置。

【請求項 13】 前記第 2 の家電機器に関するデータを保持する機器データ保持手段と、前記受信手段が受信したサービスの利用要求に応じて前記第 2 の家電機器を示すデータを前記第 1 の家電機器に送信する機器データ送信手段とを備えることを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 14】 前記サービスの提供要求に応じて、前記第 1 の家電機器にユーザに対する指示を送信する指示送信手段と、該送信したユーザに対する指示に応じた完了情報を前記第 1 の家電機器から受信した場合に、前記第 2 の家電機器に対するサービスの提供を開始するサービス提供制御手段とを備えることを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 15】 前記第 1 の家電機器と前記第 2 の家電機器は、各々異なる構内ネットワークに接続されている

ことを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 16】 前記第 1 の家電機器が接続されている構内ネットワークと前記第 2 の家電機器が接続されている構内ネットワークは、各々前記公衆ネットワークとの中継を行う異なるルータ装置を介して前記公衆ネットワークに接続されていることを特徴とする請求項 15 記載の家電サーバ装置。

【請求項 17】 前記第 1 の家電機器及び第 2 の家電機器には、前記公衆ネットワークに接続される機器毎に固有のアドレス（グローバルアドレス）が割り当てられており、

当該家電サーバ装置からのパケットが前記公衆ネットワークを介して直接第 2 の家電機器に直接到達可能であり、

前記識別情報保持手段は、前記家電機器の識別情報に対応させて前記アドレスを保持することを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 18】 前記第 2 の家電機器には、該第 2 の家電機器が接続されている前記構内ネットワーク内でのみ有効なアドレス（ローカルアドレス）が割り当てられており、

前記識別情報保持手段は、前記家電機器の識別情報に対応させて前記ローカルアドレスが割り当てられている旨を示す情報を保持しており、

前記第 2 の家電機器と当該家電サーバ装置間の通信は、前記第 2 の家電機器が、該第 2 の家電機器が接続されている前記構内ネットワークと前記公衆ネットワークの間に設けられた中継手段に、当該家電サーバ装置のアドレス又はアドレスを示す情報を有する中継要求を送信し、該中継装置が中継要求中のアドレス又はアドレスを示す情報に応じて中継を行うことによって行うことを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 19】 前記第 2 の家電機器には、前記公衆ネットワーク側から到達不可能なアドレス（プライベートアドレス）が割り当てられており、

前記第 2 の家電機器と当該家電サーバ装置間の通信は、前記第 2 の家電機器が、該第 2 の家電機器と当該家電サーバ装置の間に設けられた中継手段に、前記家電サーバ装置のアドレス又はアドレスを示す情報を有する中継要求を送信し、該中継装置が中継要求中のアドレス又はアドレスを示す情報に応じて中継を行うことによって行うことを特徴とする請求項 12 記載の家電サーバ装置。

【請求項 20】 前記家電サーバ装置から第 2 の家電機器への通信は、所定時間毎の前記第 2 の家電機器から当該家電サーバ装置に対する送信に対する応答として行われることを特徴とする請求項 18 又は請求項 19 に記載の家電サーバ装置。

【請求項 21】 前記第 2 の家電機器と当該家電サーバ装置間の通信のプロトコルとして、HTTP (Hyper Text Transfer Protocol) プロトコルを用いることを特徴と

する請求項17乃至請求項19に記載の家電サーバ装置。

【請求項22】 公衆ネットワーク経由で接続された家電サーバ装置が提供するサービスを利用する家電機器が接続された構内ネットワークと前記家電サーバ装置間に設置される中継装置であって、前記家電機器には、前記構内ネットワーク内でのみ有効なアドレス（ローカルアドレス）が割り当てられており、前記構内ネットワークを介して前記家電装置から受信した前記家電サーバ装置のアドレス又はアドレスを示す情報を有する中継要求を受信する受信手段と、該受信した中継要求中の前記家電サーバ装置のアドレス又はアドレスを示す情報に応じて、前記公衆ネットワークを介して前記家電サーバ装置に対する送信を行う送信手段とを備えることを特徴とする中継装置。

【請求項23】 前記第2の家電機器と前記家電サーバ装置間の通信は、所定時間毎の前記第2の家電機器から前記家電サーバ装置に対する送信と、その応答として行われることを特徴とする請求項22記載の中継装置。

【請求項24】 本中継装置と前記家電サーバ装置間の通信のprotocolsとして、HTTP (Hyper Text Transfer Protocol) プロトコルを用いることを特徴とする請求項22記載の中継装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、家電機器、公衆ネットワーク経由で家電機器にサービスを提供する家電サーバ装置及び家電装置と家電サーバ装置間の通信を中継する中継装置に関する。

【0002】

【従来の技術】 近年、他の情報処理装置等との通信機能を備えた家電機器が開発されている。例えばテレビジョン装置、録画装置、音響装置等のいわゆる音響映像機器間の通信プロトコルとして、IEEE1394が知られている。このIEEE1394では、映像音響機器間の通信手順等が規定されており、映像音響機器間の連携した動作が可能になっている。

【0003】 また、例えば空調装置、給湯管理装置、照明装置、洗濯機、冷蔵庫、電子レンジ等の電力系家電機器（いわゆる白物家電機器）間のインターフェースで使用するプロトコルとしてエコーネット（ECHONET）が知られている。このエコーネットでは、電波、赤外線等の無線回線を用いて通信を行うもの、他、電灯線等の有線回線を用いて通信を行うものが規格化されている。また、このエコーネットでは、各機器が有する機能をオブジェクトとして定義しており、制御手順の統一が図られている。このようなエコーネットを用いることにより、家電機器間の連携動作、集中管理等が可能になっ

ている。

【0004】 また、これらのプロトコルでは、そのままではインターネット等のネットワークと直接通信することができないため、これらのネットワークで一般的に用いられているTCP/IPプロトコルとの変換を行うゲートウェイ装置が開発されている。このようなゲートウェイ装置を用いることにより、ネットワークを介して接続された複数の家電機器を遠隔地から制御することができるようになっている。

【0005】 ユーザ毎の環境の違いあるいはユーザ毎の要求の違いを吸収するために、上述のような家電機器に対して、ネットワーク経由で、遠隔地からの管理を受けるプログラムをダウンロードしたり、予め家電機器に遠隔地からの管理を受けるプログラムを格納しておき、ネットワーク経由で遠隔地からの管理を受け入れる動作状態とすることが望まれている。

【0006】

【発明が解決しようとする課題】 しかしながら、上述のように全ての家電機器で統一された通信プロトコルは確立されていないため、家電機器で利用できる通信プロトコルは、当該家電機器が設置される環境によって様々である。

【0007】 また、全ての設置環境に対応できるように、全ての通信プロトコルに対応したプログラムを予め各々の家電機器に実装しておくことは、コストの制約等の観点から困難であった。

【0008】 本発明は、上述の課題に鑑みてなされたものであり、設置環境が異なる家電機器の遠隔地からの管理を容易に実現することができる家電機器、家電サーバ装置、ゲートウェイ装置及び家電制御システムを提供することを目的とする。

【0009】

【課題を解決するための手段】 上述の問題を解決するために、本発明の請求項1に係る家電機器は、公衆ネットワークを介してサービスを提供する家電サーバ装置にサービスの利用を申し込む家電機器であって、複数のカテゴリに属し、家電サーバ装置と通信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を保持する識別情報保持手段と、構内ネットワーク又は公衆ネットワークを介して家電サーバ装置と通信を行う通信手段と、同一の所有者の家電機器の識別情報を所有者毎に保持し、所有者毎にサービスの提供を管理する家電サーバ装置に、当該家電機器（第1の家電機器）の識別情報と当該家電機器の所有者の家電機器（第2の家電機器）に対するサービスの提供要求を送信するサービス要求手段とを備えることを特徴とする。

【0010】 また、本発明の請求項4に係る家電機器は、公衆ネットワークを介してサービスを提供する家電サーバ装置から提供されるサービスを利用する家電機器であって、複数のカテゴリに属し、家電サーバ装置と通



信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を保持する識別情報保持手段と、構内ネットワーク又は公衆ネットワークを介して家電サーバ装置と通信を行う通信手段と、同一の所有者の家電機器の識別情報を所有者毎に保持し、所有者毎にサービスの提供を管理する家電サーバ装置が、サービス要求を送信する家電機器（第1の家電機器）が送信した家電機器の識別情報と当該家電機器（第2の家電機器）に対するサービスの提供要求に応じて送信するサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを通信手段を介して受信する受信手段と、受信したサービス利用ソフトウェア又はコマンドに応じて当該サービス利用ソフトウェアを実行し、家電サーバからのサービスの提供を受けるサービス利用手段とを備えることを特徴とする。

【0011】家電機器とは、家庭等において用いられる電子機器等を言い、例えば空調装置、給湯管理装置、照明装置、洗濯機、冷蔵庫、電子レンジ等の電力系家電機器いわゆる白物家電機器の他、テレビジョン装置、録画装置、音響装置等のいわゆる音響映像機器が含まれる。

【0012】また、本発明の請求項12に係る家電サーバ装置は、公衆ネットワークを介して家電機器に対するサービスを提供する家電サーバ装置であって、複数のカテゴリに属し、当該家電サーバ装置と通信を行い得る家電機器間で重複のないように予め割り当てられた固有の識別情報を所有者毎に保持する識別情報保持手段と、サービスの利用を要求する家電機器（第1の家電機器）から送信された当該第1の家電機器の識別情報と、サービスを利用する家電機器（第2の家電機器）を示す情報を含むサービスの利用要求を受信する受信手段と、識別情報保持手段を参照して、受信した第1の家電機器の識別情報に対応する所有者が受信した第2の家電機器を示す情報に対応する家電機器を所有しているか否かを確認する確認手段と、確認手段が、サービスの利用要求に対応する所有者が第2の家電機器を所有していることを確認した場合に、第2の家電機器宛てにサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを送信する送信手段とを備えることを特徴とする。

【0013】また、本発明の請求項22に係る中継装置は、公衆ネットワーク経由で接続された家電サーバ装置が提供するサービスを利用する家電機器が接続された構内ネットワークと前記家電サーバ装置間に設置される中継装置であって、家電機器には、構内ネットワーク内でのみ有効なアドレス（ローカルアドレス）が割り当てられており、構内ネットワークを介して家電装置から受信した家電サーバ装置のアドレス又はアドレスを示す情報を有する中継要求を受信する受信手段と、受信した中継要求中の家電サーバ装置のアドレス又はアドレスを示す

情報に応じて、公衆ネットワークを介して家電サーバ装置に対する送信を行う送信手段とを備えることを特徴とする。

#### 【0014】

【発明の実施の形態】本発明は、例えば家電機器を一括して管理する家電制御システムに適用することができる。

#### 【0015】第1の実施形態

（構成）本発明を適用した第1の実施形態に係る家電制御システムは、例えば図1に示すように、例えば建物1内に設置された第1の10、第2のネットワーク20等のプライベートネットワークと、これらのネットワーク10、20と建物1外部の第3のネットワーク（インターネット等の公衆ネットワーク）30を介して接続された家電サーバ装置40、端末装置50と、基地局65、ゲートウェイ装置60を介してネットワーク30に接続される携帯端末装置70とを備えている。

【0016】第1のネットワーク10は、例えば音響映像（AV：Audio Visual）系の家電機器が接続されるネットワークであり、例えば物理層としてIEEE1394等のプロトコルを用いた有線ネットワークからなる。このネットワーク10は、例えば有線回線11を介して接続されたテレビジョン受像機（TV装置）12、磁気テープ、磁気ディスク、光ディスク等の記録媒体を用いて画像情報の記録／再生を行う録画装置13と、磁気テープ、磁気ディスク、光ディスク、メモリ等の記録媒体を用いて音楽等の音声情報の記録／再生を行う音響装置14と、有線回線11とネットワーク30との物理層のプロトコル変換、経路制御等を行うルータ装置19を備えている。

【0017】TV装置12は、例えば有線回線11との通信を行う通信I/F121と、例えばリモコン、本体に設けられたスイッチ等を介してユーザからの指示を入力する入力部122と、画像、データ等の放送を受信する受信部123と、HTTPd42aによって提供されるコンテンツ等を取得するWebブラウザ124と、受信部が受信した画像あるいはユーザに対する指示の要求を示す画像等を表示する表示部125と、装置全体の動作を制御する制御部126と、個々の機器毎に固有の家電IDを保持する家電ID保持部129とを備えている。

【0018】このTV装置12は、例えば家電サーバ装置40によって提供されるサービス（例えばコンテンツ配信）あるいは当該家電サーバ装置40によって提供されるサービスの申し込みサービスを利用し得るようになっている。

【0019】ルータ装置19は、例えばネットワーク30との通信を行う通信I/F291と、ネットワーク10との通信を行う通信I/F292と、経路制御等の処理を実行するルーティング制御部193とを備えてい

る。

【0020】また、第2のネットワーク20は、例えば電力系の家電機器いわゆる白物家電機器が接続されるネットワークであり、例えば物理層として無線通信プロトコルを用いた無線ネットワークからなる。このネットワーク20は、無線回線21を介して接続された空調装置22、給湯管理装置23、冷蔵庫24、電子レンジ25（一部図示せず）と、無線回線21とネットワーク30との経路制御等を行うルータ装置29を備えている。なお、このネットワーク20は、この無線ネットワークに限られず、例えば電力線等を通信路として用いる有線ネットワーク等としてもよい。

【0021】空調装置22は、例えば無線回線21を介してルータ装置29との通信を行う無線通信I/F221と、例えばリモコン、本体に設けられたスイッチ等を介してユーザからの指示を入力する入力部222と、例えば赤外線、IEEE802.11あるいはBluetooth（商標）等を用いて上述のルータ装置29と無線通信を行う無線通信I/F223と、室温を測定する温度センサ224と、例えばコンプレッサ、熱交換機等を有する室外機を制御する室外機制御部225と、家電サーバ装置40を介して供給される指示等に応じて室外機制御部225等の動作を制御する制御部226と、個々の機器毎に固有の家電IDを保持する家電ID保持部229とを備えている。

【0022】給湯管理装置23は、例えば無線回線21を介してルータ装置29と通信を行う通信I/F231と、表示画面を有する表示部232と、ユーザからの指示を入力する入力部233と、表示部232、入力部233等を制御する制御部234とを備えている。

【0023】冷蔵庫24は、例えば無線回線21を介してルータ装置29と通信を行う通信I/F241と、表示画面を有する表示部242と、ユーザからの指示を入力する入力部243と、表示部242、入力部243等を制御する制御部244とを備えている。

【0024】電子レンジ25は、例えば無線回線21を介してルータ装置29と通信を行う通信I/F251と、表示画面を有する表示部252と、ユーザからの指示を入力する入力部253と、表示部252、入力部253等を制御する制御部254とを備えている。

【0025】ルータ装置29は、例えばネットワーク30との通信を行う通信I/F291と、上述の通信I/F221と無線通信を行う無線通信I/F292と、経路制御等の処理を実行するルーティング制御部293とを備えている。

【0026】ネットワーク30は、例えばISDN、CATV、ADSL、アナログ専用線等の伝送路としてメタルケーブルを用いたネットワークあるいはFTTH等の伝送路として光ファイバを用いたネットワークからなり、このネットワーク30では、例えばTCP/IPプ

ロトコルを用いて通信を行うようになっている。あるいは、ネットワーク30の内の建物1内の部分を、例えばIEEE802.3等のネットワークを用い、建物1外の部分を上述のようなネットワークによって構成するようにしてもよい。

【0027】家電サーバ装置40は、例えばMPU、メモリ、HDD等の補助記憶装置を有する情報処理装置からなり、上述の各ネットワーク10、20に接続された機器の動作の制御等の処理を実行する。この家電サーバ装置40は、通信インタフェース（I/F）41と、端末装置50あるいは携帯端末装置70からの指示に従って、各ネットワーク10、20に接続されている機器の制御等のサービスあるいは当該サービスの申し込みサービス等を提供するサービス提供部42と、該サービス提供部がサービスの提供のために用いるデータ等を保持するデータベース（DB）43とを備えている。

【0028】通信I/F41は、サービス提供部42によって提供するサービスをネットワーク30経由で利用するための通信制御等を実行する。

【0029】サービス提供部42は、例えばTV装置12、端末装置50、70等で機能しているWebブラウザをフロントエンドとしてサービスの提供を行うHTTPサーバ（HTTPd）42aと、DB43に対するアクセス等の制御を行うDBエンジン42bとを備えている。また、DB43は、個々のユーザ（顧客）についての情報を保持する顧客DB42aと、個々の家電機器についての機能等の情報を保持する家電DB42bとを備えている。

【0030】なお、上述の構成では、ネットワーク10とネットワーク20に各々ルータ装置19、29を設けているが、有線回線11と無線回線21各々に対応した通信I/Fを有する1台のルータ装置のみを設けるようにしてもよく、あるいはネットワーク10又はネットワーク20を細分化して3台以上のルータ装置を設ける構成としてもよい。

【0031】上述のTV装置12、空調装置22、…は、各々TCP/IPプロトコルを実装したいわゆる「ネットワーク家電」である。これらのTV装置12、空調装置22、…には、各々ネットワーク30に接続される全ての機器に対して重複のない固有のIPアドレス（グローバルアドレス）が割り当てられている。このIPアドレスのバージョンは、IPv4であってもIPv6であってもよいが、ネットワーク20に接続されている各家電機器22、23とルータ装置29とで同じバージョンのIPアドレスとする。

【0032】また、この家電制御システムでは、家電サーバ装置40で管理する全ての機器に対して各々少なくとも1つの固有の識別情報（家電ID）が割り当てられている。この家電IDは、機器の製造業者が異なっても重複がないように管理されている。この家電IDは、改

変できないように例えば製造時において家電ID保持部129、229に埋め込まれて保持されている。さらに、必要な場合には、暗号化等の方法により、家電IDが直接知られることがないように保持されている。具体的には、例えば制御部126、226を構成するICチップ内等のレジスタ等として実装することができる。

【0033】家電IDとしては、IPアドレス（グローバルアドレス）、Bluetooth-ID、IEEE1394のEUI64等のMAC（Media Access Control）アドレスをそのまま用いることもできる。これらのアドレスは、本来的に個々の機器毎で重複がないように管理されているため、これらを家電IDとして流用することにより、家電IDの管理負担の低減に寄与することができる。なお、このように他のアドレスを家電IDとして流用する場合であっても、これらのアドレスと家電IDとは論理的に別の意味を有する独立した値として管理され、家電サーバ装置40が個々の家電機器を識別するために用いられる。

【0034】顧客DB43aには、例えば図2に示すように、個々のユーザを識別するための情報（ユーザ名）、当該ユーザについて情報（ユーザ情報）、当該ユーザが所有する全ての家電機器の家電ID（所有家電の家電ID）、当該家電機器の種別及び型番を示す情報（種別・型番）、当該家電機器までの通信方法を示す情報（アクセス：例えばIPv6かIPv4か等）、当該所有家電機器のアドレス（アドレス）及び当該所有家電機器の遠隔制御の可否を示す情報（遠隔制御可否）を対応付ける対応テーブルが格納されている。

【0035】なお、前記家電機器のアドレスについては、IPアドレスの値そのものであっても良いし、家電機器に割当てられるネーム（例えばDNSネーム）の値であっても良い。ネームである場合には、まず家電サーバ装置は、このネームの値をIPアドレスに変換する作業を最初に行う必要がある。

【0036】ユーザ名は個々のユーザに固有の情報であれば足り、例えば顧客番号等の管理上の便宜的に付与する情報としてもよい。

【0037】ユーザについての情報は、例えば当該ユーザの住所、氏名、年齢、職業、電話番号、ネットワーク接続サービスの提供者（プロバイダ）、電子メールアドレス、当該ユーザの好み等を示す情報からなる。また、ユーザについての情報の記述方法は、ある一人のユーザではなく、例えば世帯主の情報を代表として、その一家の機器を全て包含するようにしても良いし、ある会社が保有する家電機器について、その会社名を所有者として登録しておいても良い。

【0038】また、所有家電の家電IDは、上述の家電ID保持部129、229に保持されている家電IDである。この家電IDは、ユーザが家電機器を購入する際に、当該ユーザの氏名等に対応付けてDBエンジン42

bに入力する。具体的には、例えばユーザが家電機器を購入する際に、販売店等から住所、氏名等を記入する用紙を提供し、ユーザが記入した内容を、例えば販売店の店員等がネットワーク30経由で家電サーバ装置40に接続された端末装置等を介して入力し、入力された情報を当該端末装置がDBエンジン42bに供給する。

【0039】あるいは、この購入時に家電サーバを介した遠隔操作等のサービスの利用の申し込みを受け付けてもよい。この場合、例えば住所、氏名等と共に利用するサービスを特定する情報を記入する利用申込書をユーザに提供し、ユーザが利用申込書に記入した、住所、氏名、年齢、職業、電話番号、電子メール、好み等の情報と利用するサービスを示す情報及び購入した機器の家電IDを、上述と同様に販売店の店員等が端末装置等を介してDBエンジン42bに供給する。

【0040】上述のようにDBエンジン42bに供給された情報は、DBエンジン42bを介して顧客DB43aに供給され、ユーザが購入した家電機器を示す家電ID等の情報が、当該ユーザのユーザ名、ユーザ情報に対応付けて顧客DB43a中の対応テーブルに記録される。

【0041】なお、利用申込書の各項目の記入は、サービスの提供に必要なもののみ必須としておき、必ずしも必要ないものはユーザの任意としておいてもよい。また、ユーザの住所、氏名等の情報及び家電IDの登録は、機器の購入時ではなく、購入後随時、あるいは家電サーバが提供するサービスの利用を申し込む際等であってもよい。この申し込みは、例えばユーザからの電話あるいはユーザから郵送されてきた申込用紙に応じて家電サーバ装置40の操作者等がDB43に入力するようにしてもよいが、ユーザがネットワーク10、20、またはネットワーク30に接続された端末装置で実行されているWebブラウザを操作してHTTPd42a経由で入力するようにしてもよい。

【0042】この顧客DB43a中では、ユーザ名每あるいは同一のユーザ名及び住所等のユーザ情報の少なくとも一部が同一であるユーザ毎に、登録された機器の家電ID等を管理する。この図2中では、ユーザ名、住所等の条件が全て同一であるユーザ毎に、当該ユーザが所有する家電機器についての情報を管理するようにしている。

【0043】顧客DB43aをこのような構成とすることにより、ユーザ名あるいはユーザ情報を検索キーとして当該ユーザが所有する家電機器の一覧を検索することができるようになっている。

【0044】また、この顧客DB43aには、各々の機器の家電IDに対応付けて、家電機器の種別（例えばTV装置、録画装置、空調装置、給湯管理装置等の別）、家電機器の製造者／型番、製造年月日、購入履歴、メンテナンス記録等を示す情報が記録されている。

【0045】また、この顧客DB43aには、上述の図2に示すように、家電サーバから当該家電機器までのアクセス方法（図2中の「アクセス」：インターネット等のネットワーク、電話あるいはその他の方法等の別を示す情報、常時接続、必要時に接続を設定するいわゆるダイヤルアップあるいはその他の方法等の別を示す情報等）、途中にアドレス変換等が入ることがあるかを示す情報等）、当該家電機器のアドレス（IPアドレス、電話番号、プロキシサーバ等のアドレスを示す情報と、アクセス方法を示す情報等）が各々の家電機器の家電IDに

対応付けて記録されている。

【0046】なお、家電機器の購入時あるいはサービスの申し込み時には、家電IDに対応する情報の一部が空欄になっている場合もあり得る。例えば家電機器のIPアドレスは、当該家電機器をネットワークに接続する際に設定するため、購入時には不明である場合が一般的であると考えられる。

【0047】この場合、サービスの提供が開始される前に、上述の図2中のアクセス、アドレス等の情報を登録する。具体的には、例えばユーザが購入した家電機器を宅内のネットワーク20等に接続する際に、この家電機器にIPアドレスが割り当てられる。この後、当該家電機器は、ルータ装置29等を介してDBエンジン42b宛てに、自機器の家電IDと割り当てられたIPアドレス（IPv4アドレス、IPv6アドレス、DNSネーム等）及びアクセス方法を示す情報を供給して登録を要求する。各家電機器は、予め家電サーバ装置40のアドレス、家電サーバ装置40までのアクセス方法等を保持しており、各家電機器は、これらに応じて家電サーバ装置40に家電ID、IPアドレス等を供給する。

【0048】このように家電ID、IPアドレス等が供給されると、家電サーバ装置40のDBエンジン42bは、供給された家電ID、IPアドレス等を顧客DB43aに登録する。

【0049】なお、顧客DB43aは、この図2に示す構成に限定されるものではなく、例えばこの顧客DB43aと同様な論理的な構造を有しているが、物理的には複数のファイル等に分散されて格納されており、これらをポインタで対応付けすることによって構成するようにしてもよい。

【0050】また、家電DB43bには、例えば図3に示すように、個々の家電機器毎に利用可能な機能が、この家電機器を識別するための情報（種別、型番）に対応付けられて保持されている。また、この家電DB43bに、家電ID、または製品型番等に対応付けて家電機器についての情報、例えば外形寸法、消費電力等の仕様あるいは当該家電機器の概観を示す画像等を格納しておくようにしてもよい。

【0051】（動作）

（1）家電機器に対するプログラムの供給

ところで、上述のTV装置12、空調装置22等の家電機器は、通信I/F121あるいは無線通信I/F221を介した外部との通信メッセージ等に応じて動作の管理を行い得るように構成されている。このため、これらの機器と家電サーバ装置40を接続し、家電サーバ装置40から提供されるサービスを利用する動作状態とすれば、例えば遠隔操作、リモートメンテナンスあるいはソフトウェア配信等の家電サーバ装置40が提供するサービスを利用することができるようになる。

【0052】この実施形態では、各ネットワーク10、20に接続される家電機器にはTCP/IPプロトコルが実装されているため、ルータ装置19、29を介してネットワーク30に接続すれば家電サーバ装置40と通信を行うことができるようになる。

【0053】各家電機器の制御部は、予め、例えばサービスを提供する家電サーバ装置40のアドレスを示すURL（Unified Resource Locator）等の情報（例えば「server.kaden.co.jp」等）を保持している。あるいは、IPアドレス（例えば「Z」等）をそのまま保持しておくようにしてもよい。

【0054】あるいは、例えばTV装置12の受信部123等が受信したデータからサービスを提供する家電サーバ装置40のアドレスを取得するようにしてもよい。具体的には、例えばサービスを提供する家電機器（例えば空調装置22）の商業等の映像に対応付けて、当該家電機器を識別するための情報と、当該家電機器に対するサービスを提供する家電サーバ装置40のアドレスを供給する。

【0055】あるいは、ユーザが別途、家電サーバ装置40のアドレスを取得し、取得したアドレスを例えばWebブラウザ124等を介して入力し、入力したアドレスを当該サービスの提供を受ける家電機器に供給するようにしてもよい。

【0056】また、家電サーバ装置40が提供するサービスをユーザが実際に利用するためには、家電機器に当該サービスを利用するための処理を実行するためのプログラムを提供するか、予め、家電機器に実装されている当該プログラムを実行可能な状態にする必要がある。

【0057】ところで、家電サーバ装置40に対するサービスの提供等の要求は、ユーザからの指示を入力する入力機能とユーザに対する指示等を表示する表示機能を有する端末装置50、携帯端末装置70あるいはTV装置12等の機器を用いて行うようになっている。

【0058】例えば空調装置22に対する遠隔操作のサービスの提供を受ける場合には、ユーザは、例えばTV装置12を操作して、家電サーバ装置40に当該遠隔制御のサービスの提供を要求する。

【0059】具体的には、例えば図4に示すように、ユーザがTV装置12のWebブラウザ124が表示部125に表示させる申し込みフォーム等にユーザが上述の

住所、氏名等の情報等を入力して空調装置 22 の遠隔制御サービスの申し込みを指示する (S1)。この申し込みフォームは、例えば上述の家電 ID と同様に、TV 装置 12 に予め格納しておいてもよい。あるいは、申し込みフォームの URL のみ TV 装置 12 に格納しておき、ユーザからの指示に応じて Web ブラウザ 124 が当該 URL から申し込みフォームを取得するようにしてもよい。

【0060】ユーザが、申し込みフォームに入力された住所、氏名等のユーザについての情報と家電 ID (この場合は、TV 装置 12 の家電 ID である "A")、提供を要求するサービス (この場合では、空調装置 22 の遠隔制御) を識別するための情報等を入力すると、Web ブラウザ 124 はこれらの情報を含む申し込みメッセージを生成し、これを暗号化して家電サーバ装置 40宛てに送信する。具体的には、この申し込みメッセージは、例えば SSL (Secure Sockets Layer) 等の手順によって暗号化されて送信される。送信された申し込みメッセージは、通信 I/F 121、ルータ装置 19 及びネットワーク 30 を介して家電サーバ装置 40 に供給される (S2)。なお、TV 装置 12 の家電 ID は、ユーザが入力しなくとも、自動的に家電サーバ装置 40 に渡されるような構成となってもよい。

【0061】供給された申し込みメッセージは、通信 I/F 41、HTTPd 42a を介して DB エンジン 42b に供給される。DB エンジン 42b は、供給された申し込みメッセージ中の家電 ID を抽出し、DB エンジン 42b は、顧客 DB 43a を参照して、当該家電 ID に対応するユーザの情報 (ユーザ名) 及び家電機器の種別・型番等を取得する (S3)。さらに、DB エンジン 42b は、家電 DB 43b から当該家電機器の画像等の情報を取得し、HTTPd 42a に供給する。HTTPd 42a は、供給された画像データの表示指示、ユーザからの確認指示を入力するボタン等の定義等を含むサービスの提供の申し込みに対する確認画面を表示させるデータ (例えば HTML (Hyper Text Markup Language) 形式あるいは XML (eXtensible Markup Language) 形式のデータ) を生成する。生成されたデータは、通信 I/F 41 を介して TV 装置 12 に供給される (S4)。

【0062】このような確認画面のデータ中では、例えば DB エンジン 42b が顧客 DB 43a から取得した、購入履歴、メンテナンス履歴等の表示を定義しておいてもよい。

【0063】ところで、このような確認画面のデータを作成する前に、DB エンジン 42b が家電 DB 43b に格納されている対応テーブルを参照し、上述の S3 において取得した家電機器の種別・型番に対応する家電機器が利用可能な機能を確認し、ユーザが要求しているサービスを現実利用可能であるか否かを判定するようにしてもよい。この場合、HTTPd 42a は、ユーザが要

求したサービスが利用可能であれば S4 の処理を実行するが、利用可能でない場合には、別途利用可能でない旨を示すデータを生成し、TV 装置 12 宛てに送信する。

【0064】このような処理を行うことにより、ユーザがサービスの利用可否を認識して、サービスの提供の要求処理を再度実行することができ、操作性の向上に寄与することができる。

【0065】上述のような確認画面のデータが供給されると Web ブラウザ 124 は、当該データに応じた画面を表示部 125 に表示させ、ユーザに確認を要求する (S5)。

【0066】このような確認画面を見たユーザが入力部 122 を操作して、確認指示を入力すると、Web ブラウザ 124 は、確認応答のメッセージを生成して家電サーバ装置 40 宛てに送信する (S6)。

【0067】このような確認応答が供給されると、HTTPd 42a は、例えば SSL によって空調装置 22 の認証、鍵の交換等の処理を行った後 (S7)、空調装置 22 に対して所定のコマンドを送信して、空調装置 22 をプログラムの受信を行う状態とした後、遠隔制御を受けるプログラムを供給する (S8)。

【0068】このプログラムは、ルータ装置 29、無線通信 I/F 221 を介して制御部 225 に供給され、制御部 225 が備えるメモリ等に格納され、実行状態となる (S9)。

【0069】この状態で、例えば家電サーバ装置 40 から空調装置 22 宛てに遠隔制御のコマンドが供給されると、空調装置 22 が当該コマンドに応じて動作を制御し得る状態となる。

【0070】プログラムの提供が成功すると、DB エンジン 42b は、プログラムを提供した家電機器に対応する顧客 DB 43a 中の情報 (遠隔制御可否) を「否」から「可」に変更する。

【0071】ところで、この家電制御システムでは、家電サーバ装置 40 とサービスの提供を要求する TV 装置 12 あるいはサービスの提供を受ける空調装置 22 との間では、同一のプロトコル (例えば TCP/IP) を用いて、エンド・ツー・エンド (End to End) の関係で直接通信することができるようになっている。このため、上述のようにルータ装置 19 を介して申し込みメッセージを家電サーバ装置 40 に供給し、これに応じて供給されたプログラムをルータ装置 29 を介してそのままサービスの提供を受ける空調装置 22 に供給することができる。

【0072】また、この家電制御システムでは、各々の家電機器に固有の家電 ID を保持しておき、個々のユーザが所有している家電機器の家電 ID を管理している。このため、サービスの提供の要求時に家電 ID を提供するだけで、家電サーバ装置 40 側において、家電 ID に対応するユーザを特定することができる。

【0073】また、家電IDに対応する家電機器の種別・型番、利用可能な機能を保持しておくことにより、家電IDに対応する利用可能な機能を特定することができ、サービスの提供の申し込み時に確認することができる。

【0074】なお、上述の説明では、ユーザがTV装置12を用いて家電サーバ装置40に空調装置22の遠隔制御サービスの提供を要求する場合について示したが、ユーザからの指示を入力する入力部とユーザに対する表示を行う表示部を有していれば、例えば端末装置50、

携帯端末装置70等の他の端末装置あるいは他の家電機器を用いて家電サーバ装置40にサービスの要求を行うようにしてもよい。

【0075】また、上述の説明では、申し込みメッセージ中では、当該申し込みメッセージを送信する家電機器の家電ID（上述の例ではTV装置12の家電IDである“A”）のみを送信し、家電サーバ装置40が、顧客DB43aを参照して当該申し込みメッセージを送信した家電機器のユーザが所有している家電機器の家電ID

のリストを取得し、これらの家電IDに対応する表示とこれらの選択を行うための処理の記述を含むデータ（例えばHTML形式あるいはXML形式のデータ）を作成し、HTTPd42aを介してWebブラウザ124に供給し、これに応じてユーザが入力した指示に応じて家電IDを選択するようにしてもよい。また、サービスの提供を受ける家電機器の家電IDを、上述の申込みメッセージの中で指定するようにしてもよい。

【0076】また、上述の説明では、ユーザが提供を受けるサービスは、上述の申し込みメッセージ中で指定する場合について示したが、DBエンジン42bが、TV

装置12等から供給された家電IDに対応する家電機器において利用可能な機能を、家電DB43bに保持されている対応テーブルから取得し、利用可能な機能の表示とこれらの選択を行う処理の記述を含むデータを生成し、これに応じてユーザから指示された機能を申し込み対象のサービスとするようにしてもよい。あるいは、DBエンジン42bが家電DB43bから取得した機能等に応じて、申し込み対象のサービスを推測し、推測したサービスでいいか否かをユーザに確認するようにしてもよい。

【0077】（2）サービスの利用（遠隔制御）  
上述のように、家電サーバ装置40からの遠隔制御サービスを受けるためのプログラムが実行状態になると、空調装置22は、入力部222からの指示入力の他に、家電サーバ装置40から指示コマンドの入力を監視する状態となる。

【0078】ユーザは、例えば端末装置50あるいは携帯端末装置70のいずれを用いても遠隔制御サービスを利用することができるようになっているが、以下の説明では携帯端末装置70を用いた場合について説明する。

【0079】ユーザが遠隔制御サービスの利用を指示すると、携帯端末装置70は家電サーバ装置40に対するログイン処理を実行する（S11）。このログイン処理では、携帯端末装置70が認証情報を家電サーバ装置40に送信する。認証情報が正当なものであると確認すると、家電サーバ装置40は、携帯端末装置70との間で例えばSSL等による暗号化通信のための鍵の交換を行う。また、必要に応じて、ユーザに対して予め割当てられたユーザIDとパスワードの入力等、本人確認のための認証を行ってもよい。

【0080】鍵の交換が終了すると、携帯端末装置70のWebブラウザ74は、HTTPd42aに対して、空調装置22の遠隔制御を指示するためのデータ（家電制御ページ）の送信を要求する（S12）。

【0081】このような要求に対して、HTTPd42aは、例えばコマンドを入力する入力欄あるいはコマンドの選択入力等が定義されたデータを家電制御ページのデータとしてWebブラウザ74に供給する（S13）。

【0082】このようなデータが供給されるとWebブラウザ74は、表示部73に当該データに応じた画像を表示させる。この画像中では、例えば設定する温度の入力を促す表示が含まれており、この画像に対してユーザが、例えば入力部72に設けられた「2」と「5」のキーを押して設定温度を25℃とすることを要求すると（S14）、空調装置22の設定温度を25℃とする旨のメッセージがWebブラウザ74によって生成され、当該メッセージ（温度設定要求）を家電サーバ装置40宛てに送信する（S15）。

【0083】このような温度設定要求を受信すると、DBエンジン42bは、顧客DB43a中の対応テーブルから当該ユーザの空調装置22までのアクセス方法（図2中のアクセス）、アドレス等の情報を取得する。サービス提供部42は、取得したアクセス方法によって空調装置22との間で認証処理、鍵の交換処理を実行する（S16）。

【0084】これらの処理が成功すると、サービス提供部42は、上述のWebブラウザ74からの温度設定要求を暗号化し、デジタル署名を付して空調装置22に供給する（S17）。

【0085】制御部225は、供給された温度設定要求の署名の確認し、正当であれば温度設定要求を復号化し（S18）、復号化したコマンドを解釈して実行する（S19）。

【0086】さらに、このような遠隔制御が成功した場合に、制御部225がその旨を示す情報を生成して家電サーバ装置40宛てに送信し（S20）、家電サーバ装置40がこれを携帯端末装置70に転送し（S21）、表示部73によって、遠隔制御が成功した旨を通知するようにしてもよい（S22）。



【0087】（効果）以上説明したように、この第1の実施形態の家電制御システムでは、携帯端末装置等の遠隔地の端末装置から宅内のネットワークに接続された家電機器の制御を容易に行うことができる。したがって、設置環境が異なる家電機器であっても遠隔地からの管理を容易に実現することができる。

【0088】（変形例）なお、上述の図4に示す処理中のTV装置12と家電サーバ装置40間の通信あるいは上述の図5に示す処理中の携帯端末装置70と家電サーバ装置40間の通信において使用するプロトコルは、特に制約されず、例えばHTTP等で定義されている標準化されたコマンドでも、独自に規定したコマンドでもよい。

【0089】HTTPを用いる場合には、家電サーバ装置40との間にファイアウォール、プロキシ等の装置が配置されていた場合であっても、これらの装置の設定を適宜変更することにより、容易に家電サーバ装置40との間の通信を可能にすることができる。

【0090】第2の実施形態

上述の第1の実施形態の家電制御システムでは、空調装置22、給湯管理装置23等の第2のネットワーク20に接続される家電機器に、各々TCP/IPプロトコルが実装されており、各々の家電機器22、23には各々IPアドレスが割り当てられていた。

【0091】しかし、エコーネットでは、各機器には、必ずしもTCP/IP等のプロトコルを実装する必要はないため、エコーネットのプロトコルとTCP/IP等のプロトコルの変換を行うゲートウェイ装置を介してネットワーク30に接続するように構成することもできる。

【0092】（構成）本発明の第2の実施形態に係る家電制御システムでは、例えば図6に示すように、上述の図1中のネットワーク20の代わりに、ネットワーク80を備えている。このネットワーク80では、上述のネットワーク20とは異なり、エコーネット独自のプロトコルによって通信を行うようになっている。

【0093】このネットワーク80に接続される空調装置22、給湯管理装置23には、上述の第1の実施形態とは異なり、IPアドレスは割り当てられていない。なお、家電IDは、上述の第1の実施形態と同様に、個々の機器22、23、89に固有の値として割り当てられている。

【0094】このため、このネットワーク80では、上述のルータ装置29の代わりに、ネットワーク80内で用いられているプロトコル（エコーネット）と、ネットワーク30で用いられているプロトコル（TCP/IP）とを変換するゲートウェイ装置89を備えている。

【0095】このゲートウェイ装置89は、ネットワーク30と接続するための通信I/F891と、ネットワーク80を構成する無線回線21を介して空調装置2

2、給湯管理装置23等と接続するためのエコーネットI/F892と、プロトコル変換を行うプロトコル変換部893とを備えている。このゲートウェイ装置は、ネットワーク80とネットワーク30の間で、例えば家電機器からの家電ID等を含む家電サーバ装置40宛てのメッセージ等の中継を行うようになっている。具体的には、例えばDNSネームの解決や、メッセージ中継のためのプロトコル変換をし、家電サーバ装置40と空調装置22等の家電機器間の通信を中継する。

【0096】ネットワーク80で用いられているエコーネットでは、データは、例えば図7に示すようなパケット（エコーネットパケット）単位で送受信される。このエコーネットパケットは、ヘッダ部分（エコーネットヘッダ）とペイロード部分（エコーネットデータ）とから構成されている。

【0097】エコーネットヘッダには、送信先の機器を識別するための情報（あて先エコーネットアドレス）と、送信元の機器を識別するための情報（ソースエコーネットアドレス）等が格納されている。各々のアドレスは、エコーネットにおいて各機器毎に割り当てられるエコーネットアドレスで表されている。

【0098】また、エコーネットデータには、送信元の機器中のオブジェクトを示す情報（送信元オブジェクト）、送信先の機器中のオブジェクトを示す情報（送信先オブジェクト）、プロパティ、サービス及びゲートウェイ装置89によって家電サーバ装置40に転送してもらうメッセージの宛て先URI（Unified Resource Identifier）や、本体の転送パラメータ等が格納されている。

【0099】エコーネットでは、各々の機器に割り当てられたエコーネットアドレスと、各機器内の機能を示すオブジェクトとで、通信相手を特定するようになっている。例えば空調装置22においては、例えば室温を取得するオブジェクト、設定温度の取得/変更等のオブジェクト等が規定されている。ゲートウェイ装置89では、ネットワーク30に対する中継の要求を受け付ける中継オブジェクトが規定されている。このゲートウェイ装置89に対してネットワーク30宛ての中継を要求する必要がある家電機器では、ゲートウェイ装置89の中継オブジェクトに中継を要求する中継オブジェクトが規定されている。

【0100】なお、この図7は、IPアドレスが“Z”（家電サーバ装置40）でディレクトリ名が“/kaden”であるURI宛てに、後述のポーリング要求を送信したい場合に、ゲートウェイ装置89の中継オブジェクト宛てに送信するエコーネットパケットの例を示している。

【0101】また、ネットワーク30で用いられているTCP/IPパケットは、例えば図8に示すように、ヘッダとペイロードとから構成されている。

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【0102】ヘッダには、送信先の機器のIPアドレス（あて先IPアドレス）、送信元の機器のIPアドレス（ソースIPアドレス）、送信先のポート番号等が格納されている。また、ペイロードには、例えばHTTPd 42a宛てのメッセージが格納される。

【0103】なお、この図8は、上述の図7に示すエコーネットパケット（ポーリングのパケット）に応じて、ゲートウェイ装置89が、家電サーバ装置40宛てに送信するパケットの例を示している。

【0104】・パケットの中継

以上のようなエコーネットパケットとTCP/IPパケットとの変換を行うため、ゲートウェイ装置89のプロトコル変換部893は、例えば図9に示すように、TCP/IPパケットの送受信を行うTCP/IPパケット送受信部301と、エコーネットパケットの送受信を行うエコーネットパケット送受信部302と、パケットの変換を行うパケット変換部303とを備えている。このエコーネットパケット送受信部302あるいはパケット変換部303が上述の中継オブジェクトに相当する。

【0105】この家電制御システムでは、上述の第1の実施形態と同様に、家電サーバ装置40からネットワーク20に接続された家電機器に対する通信は、TCP/IPプロトコル上の上位プロトコルであるHTTPプロトコルに従って行われる。

【0106】このため、パケット変換部303は、HTTPパケットとエコーネットパケットの変換を行うためのテーブルを保持する対応テーブル保持部310と、TCP/IPパケット送受信部301から供給される家電サーバ装置40からのHTTPパケットのヘッダからステータスラインヘッダを抽出するステータスラインヘッダ抽出部311と、HTTPパケットのペイロードから転送パラメータを抽出する転送パラメータ抽出部312と、転送パラメータをエコーネットパケットに挿入する転送パラメータ挿入部313と、エコーパケットを形成してエコーネットパケット送受信部302に供給するエコーパケット形成部314とを備えている。

【0107】また、このパケット変換部303は、上述のエコーパケットデータから宛て先URIを抽出するURI抽出部321と、エコーパケットデータから転送パラメータを抽出する転送パラメータ抽出部322と、HTTPパケットに転送パラメータを挿入する転送パラメータ挿入部323と、家電サーバ装置40宛てのHTTPパケットを形成するHTTPパケット形成部324とを備えている。

【0108】対応テーブル保持部310には、例えば図10に示すように、HTTPパケットとエコーネットパケットの変換のための対応テーブルが格納されている。

【0109】対応テーブル保持部310には、上述のエコーネットパケットによるコマンドと、HTTPパケットによるコマンド（例えばHTTPd 42aに対するH

TTTPコマンド）間の対応関係を示す対応テーブルが保持されている。この対応テーブルを参照することにより、エコーネットパケットによるコマンドとHTTPコマンドとの間の対応関係を知ることができる。

【0110】具体的には、この対応テーブルには、エコーネットデータ中のあて先URI（例えばIPアドレス[Z]と当該アドレスのHTTPd 42aのディレクトリ[/kaden]）と当該URIと通信を行う家電機器のエコーネットアドレス（例えば空調装置22のエコーネットアドレス[E1]）とが対応付けられて格納されている。

【0111】この家電制御システムでは、このような構成のゲートウェイ装置89により、ネットワーク80とネットワーク30との間のプロトコル変換が可能になっている。これにより、家電サーバ装置40とネットワーク80に接続されている家電機器で実行されているアプリケーションレベル間で1対1（エンド・ツー・エンド）の通信を行うことができるようになっている。なお、この場合、この通信にエンド・ツー・エンドの形で暗号をかけても良い。このようにすることにより、ゲートウェイ装置に知られることなく、家電サーバ装置と家電機器間で任意の通信を行うことが可能となる。

【0112】・ポーリング

ところで、上述のようにネットワーク80とネットワーク30相互のパケットの変換は可能になっている。これにより、ネットワーク80に接続された空調装置22、給湯管理装置23からは家電サーバ装置40のURIを指定して通信を開始できるようになっている。しかしながら、家電サーバ装置40側からはゲートウェイ装置89を介して接続されている空調装置22等の家電機器を直接指定して通信を開始することはできない。なぜなら、家電機器は直接家電サーバ装置との間でIPでの通信が出来るように設定されていないためである。

【0113】このため、この家電制御システムでは、遠隔制御サービスの提供を受ける家電機器側から所定の時間間隔毎に、家電サーバ装置40に対して送信を開始するようになっている。このような所定時間間隔の送信動作をポーリングという。ポーリングを行った家電機器は、ポーリングに対する家電サーバ装置40からの応答があれば当該受信を受信するが、所定時間内に応答がない場合（該ポーリングの返答であるパケットに、家電サーバからの制御コマンド等が搭載されていない場合等）には、次のポーリングをすべき時刻まで待機する。

【0114】家電サーバ装置40は、家電機器に対する送信の必要がなければポーリングを無視する（ヌルを返答するのでもよい）が、当該家電機器に対する送信の必要があれば、ポーリングに対する応答として送信を開始する。

【0115】この家電制御システムでは、このようなポーリング処理によって、実質的に家電サーバ装置40側

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からの通信の開始を実現している。

【0116】なお、このポーリング周期については、デフォルト値が定められており、この値を家電サーバ装置からの制御により、任意の値に変更が可能になっているも良い。

#### 【0117】・顧客DBの構成

また、家電サーバ装置40は、このようなポーリング処理を行う必要のある家電機器とTCP/IPプロトコルで直接通信を行うことができる家電機器とが混在する環境下でのサービスの提供を実現するために、例えば図11に示すように、顧客DB43a中の対応テーブル内の各々の家電機器までの通信方法を示すアクセスとして、TCP/IPによる直接通信が可能であるかポーリング処理の必要があるか等を示す情報を保持しておくようになっている。TCP/IPによる直接通信が可能である場合には、アクセスとして、例えばTCP/IPのバージョンを示す情報[IPv4, IPv6]が保持され、ポーリング処理が必要である場合には、その旨を示す情報と[機器からのポーリング]とポーリングの間隔を示す情報[30秒毎]とが保持される。

【0118】また、TCP/IPによる通信が可能である場合には、アドレスとしてIPアドレス(例えばTV装置12のIPアドレス[X])が保持されるが、ポーリング処理が必要な場合には、エコーネットアドレスが保持される。なお、ポーリング前には家電機器のエコーネットアドレスは不明であるが、ポーリングがあると、当該ポーリングのTCP/IPパケットのペイロード中で定義されているエコーネットアドレスが抽出されアドレスとして格納される。

【0119】また、上記のポーリングの中継等を行うホームゲートウェイ装置やルータ装置へのアクセス方法や、そのアドレス、またはネームについての情報も、この顧客DBに記載されていても良い。もちろん、このホームゲートウェイ装置そのものが家電IDを有しており、これらが顧客DBに登録をされていても良い。

#### 【0120】(動作)

##### (1) 家電機器に対するプログラムの供給

上述のように構成された家電制御システムにおいて、家電サーバ装置40にサービスの提供を申し込む際の動作は、例えば図12に示すように、ユーザがTV装置12を操作して、サービスの提供を申し込み、これに対する家電サーバ装置40からの確認応答に対して確認応答を送信するまでの処理(S31~S36)は、上述の図4中のS1~S6までと同様であるが、この後の処理が異なる。

【0121】TV装置12からの確認応答を受信したHTTpd42aは、上述の図11に示す顧客DB43aを確認し、サービスの提供対象である空調装置22に対するアクセス方法を取得する。これにより、HTTpd42aは、空調装置22に対する通信がポーリング処理

が必要なものであることを知り、当該空調装置22からのポーリングを開始させるべく、ユーザに当該空調装置22の電源の投入、ネットワーク80に対する接続を指示するメッセージ(電源投入指示)を生成し、TV装置12宛てに送信する(S37)。TV装置12は、このような電源投入指示を受信すると、ユーザに空調装置22の電源の投入等を指示する画像を表示部125に表示させる(S38)。

【0122】この画像は、例えば「空調装置の電源スイッチを入れ、ネットワーク接続(インターネット接続)ができる状態にして下さい(必要なら、ゲートウェイ装置の電源も投入してください)」といった内容を示すものであり、このような画像が、TV装置12の表示部125に表示されると、ユーザに空調装置22の電源投入とネットワーク80に対する接続が促される。

【0123】ユーザはこれに応じて空調装置22の電源を投入し、必要であれば空調装置22をネットワーク80に接続する(S39)。

【0124】これに応じて、空調装置22の電源が立ち上がり(S40)、当該空調装置22のエコーネットの設定が初期化され、例えばエコーネットアドレスが決定される(S41)。

【0125】この後、空調装置22は、ネットワーク80上から「ネットワーク中継機能」を有するノード(他の家電機器等)を検索する。具体的には、例えばネットワーク80に接続されたノード(他の家電機器等)に対して属性通知の要求を順に出し、「ネットワーク中継機能」を持ったノード(この場合はゲートウェイ装置89)を検出する。この後、検出したノードすなわちゲートウェイ装置89に対してその属性の通知を要求し(S42)、これに対する応答(属性通知)が空調装置22に供給される(S43)。これにより、ゲートウェイ装置89がネットワーク30に対する中継機能(ネットワーク中継機能)を有していることを知ると、空調装置22は、上述のポーリングのメッセージを家電サーバ装置40宛てに中継することを要求するエコーネットパケットをゲートウェイ装置89に送信する(S44)。このパケットは、ゲートウェイ装置89によって中継され、TCP/IPパケット(例えばHTTpd42aに対するHTTpd42aパケット)として家電サーバ装置40宛てに送信される(S45)。

【0126】具体的には、このポーリングのTCP/IPパケットとしては、例えばHTTTPの Protokol中で規定されているPOSTメソッドのパケットを用いている。このパケット中では、送信する家電サーバ装置40宛てのメッセージとして、所定の型、例えば"X-echonet-gateway"等のMIMEタイプが指定されている。これにより、このようなパケットを受信した家電サーバ装置40が、当該パケットがエコーネットノード(この場合ではゲートウェイ装置89)からのコマンドであること

を知ることができる。また、メッセージ中には、送信元の家電機器の家電IDの値が含まれており、家電サーバ装置40は、受信したポーリングのパケットがどの家電機器（家電IDを持つノード）からのものであるかについての情報を知ることができるようになっている。

【0127】上述のようなポーリングに応じてHTTPd42aは、上述の図4中のS7～S8と同様に、空調装置22の認証、鍵の交換等の処理、空調装置22に対する遠隔制御を受けるプログラムの供給等の処理を実行する（S46～S50）。この際、ゲートウェイ装置89によってプロトコルの変換が行われてパケットの中継が行われる（S47, S50）。

【0128】これにより、空調装置22が遠隔制御を受ける動作を実現するプログラムが、空調装置22の制御部225が備えるメモリ等に格納され、実行状態となる（S51）。

【0129】この状態で、例えば家電サーバ装置40から空調装置22宛てに遠隔制御のコマンドが供給されると、空調装置22が当該コマンドに応じて動作を制御し得る状態となる。

【0130】プログラムの提供が成功すると、DBエンジン42bは、プログラムを提供した家電機器に対応する顧客DB43a中の情報（遠隔制御可否）を「否」から「可」に変更する。

【0131】（2）サービスの利用（遠隔制御）

上述のように、家電サーバ装置40からの遠隔制御サービスを受けるためのプログラムが実行状態になると、空調装置22は、入力部222からの指示入力他に、家電サーバ装置40から指示コマンドの入力を監視する状態となる。

【0132】ユーザは、例えば端末装置50あるいは携帯端末装置70のいずれを用いても遠隔制御サービスを利用することができるようになっているが、以下の説明では携帯端末装置70を用いた場合について説明する。

【0133】この家電制御システムでは、例えば図13に示すように、上述の図5中のS11からS15までの処理と同様に、携帯端末装置70の認証・鍵交換（S60）、HTTPd42aに対する家電制御ページの送信要求（S61）、家電制御ページの提供（S62）、指示入力（S63）、設定要求の送信（S64）までの処理が実行される。

【0134】この後、DBエンジン42bは、顧客DB43a中の対応テーブルから当該ユーザの空調装置22までのアクセス方法（図11中のアクセス）、アドレス等の情報を取得する。

【0135】この場合、空調装置22までの通信には、ポーリング処理が必要であるため、HTTPd42aは、空調装置22からのポーリングパケット（S65）が、プロトコル変換されて（S66）、提供される（S66）まで待機する。ポーリングパケットが供給される

と、HTTPd42aは、このパケットに対する応答として空調装置22宛ての温度設定要求をゲートウェイ装置89宛に送信する（S68）。この温度設定要求は、ゲートウェイ装置89で中継されて（S69）、空調装置22に供給される（S70）。

【0136】空調装置22の制御部225は、家電サーバ装置40から供給された温度設定要求に応じて設定温度を変更する（S71）。

【0137】（効果）この家電制御システムでは、上述のように、家電サーバ装置40から空調装置22に対して遠隔制御を行う場合に、空調装置22から家電サーバ装置40に対するポーリング（例えば30秒に1回）を待って、このポーリングに対する応答として遠隔制御のコマンドを送信する。

【0138】これにより、この家電制御システムでは、インターネット等の外部のネットワークで用いられているプロトコルで通信を行うことができないために家電サーバ装置側から通信を開始することができない家電機器に対しても遠隔制御等のサービスを提供することができる。

【0139】また、この家電制御システムでは、遅くとも家電機器から家電サーバ装置40に対するポーリングの周期での制御コマンドの発行を行うことができるため、ポーリング周期を適宜設定することにより容易に応答性の向上に寄与することができる。

【0140】第3の実施形態

宅内のネットワークとインターネット等の外部のネットワークを接続する際には、セキュリティを向上させるために、これらのネットワーク間のアクセスを制限するファイアーウォール（F/W）を設ける場合がある。

【0141】また、宅内のネットワークにおいてはローカルアドレスを用い、外部のネットワークと接続するためのルータ装置が、NAT（Network Address Translation：ネットワークアドレス変換）あるいはIPマスカレード等のアドレス変換部を備えている場合がある。また、宅内のネットワークと外部のネットワークのIPアドレスのバージョンが異なる場合にもアドレス変換部が必要となる。

【0142】これらのF/W、アドレス変換部等を介在させた場合、上述の第1の実施形態のように、家電サーバ装置40と家電機器に共通の通信プロトコル（例えばTCP/IP）が実装されていたとしても、そのままではこれらの間の通信を直接行うことができない場合がある。

【0143】（構成）本発明の第3の実施形態に係る家電制御システムでは、例えば図14に示すように、上述の図1中のネットワーク20の代わりに、ネットワーク90を備えている。このネットワーク90では、上述のネットワーク20と同様に、例えばTCP/IPプロトコルによって通信を行うようになっている。このため、

ネットワーク90に接続された家電機器には、各々IPアドレスが割り当てられている。

【0144】この家電制御システムでは、上述の図1中のルータ装置29の代わりにルータ装置99を設けている。このルータ装置99は、例えばネットワーク30との通信を行う通信I/F991と、上述の通信I/F221と無線通信を行う無線通信I/F992と、経路制御、必要な場合のアドレス変換等の処理を実行するルーティング制御部993とを備えている。

【0145】このルーティング制御部993は、外部のネットワーク30で用いられているアドレス体系（例えばグローバルアドレス、IPv4等）と内部のネットワーク90で用いられているアドレス体系（例えばプライベートアドレス、IPv6等）との変換を行ってパケットの中継を行うようになっている。

【0146】具体的には、ルーティング制御部993におけるアドレスの変換は、例えばグローバルアドレスとプライベートアドレスの変換であれば、上述のNATあるいはIPマスカレード等の処理によって行う。あるいはネットワークアドレスよりも更に上位のプロトコル例えばポート番号等の対応関係の変換をも行う処理によってアドレス変換を行ってもよい。

【0147】アドレス変換の代わりに、あるいはアドレス変換と共に、ルーティング制御部993に、例えばPROXY等のアプリケーションゲートウェイ機能を設けることもできる。

【0148】なお、NAT等のアドレス変換の機能、アプリケーションゲートウェイの機能等は、必ずしもルータ装置99内に設ける必要は無く、ネットワーク30側に設けてもよい。また、これらの機能は、家電機器と家電サーバ装置40の間に複数設けることもできる。

【0149】ところで、上述のアドレス変換あるいはアプリケーションゲートウェイ等によってネットワーク30とネットワーク90との間での直接的なアクセスが制限される。従って、この家電制御システムでは、上述の第2の実施形態と同様に、家電サーバ装置40が、ネットワーク90に接続された空調装置22等のIPアドレスを直接指定して通信を開始することができない。

【0150】このため、この家電制御システムでは、上述の第2の実施形態と同様に、遠隔制御を受け得る家電機器が、所定の時間間隔で家電サーバ装置40に対してポーリングを行うようになっている。

【0151】このためのパケット（ポーリングパケット）では、例えば図15にそのフォーマットを示すように、ヘッダ中の宛て先アドレスとして家電サーバ装置40のアドレス“Z”が指定されて、宛て先ポート番号として所定のプロトコル（例えばHTTPd42aを示す“HTTP”）が指定されている。また、このパケットのペイロード中では、上述の図8と同様に、所定の命令（POST命令）等が定義されている。

【0152】また、家電サーバ装置40は、上述のようなポーリング処理を行う必要のある家電機器と直接通信を行うことができる家電機器とが混在する環境下でのサービスの提供を実現するために、例えば図16に示すように、顧客DB43a中の対応テーブル内の各々の家電機器までの通信方法を示すアクセスとして、TCP/IPによる直接通信が可能であるかポーリング処理の必要があるか等を示す情報を保持しておくようになっている。TCP/IPによる直接通信が可能である場合には、アクセスとして、例えばTCP/IPのバージョンを示す情報[IPv4, IPv6]が保持され、ポーリング処理が必要である場合には、その旨を示す情報と「機器からのポーリング」とポーリングの間隔を示す情報[30秒毎]とが保持される。

【0153】また、TCP/IPによる通信が可能である場合には、アドレスとしてIPアドレス（例えばTV装置12のIPアドレス[X]）が保持されるが、ポーリング処理が必要な場合には、パケットが直接到達できないためことを示す情報[到達不可能]が保持される。

【0154】また、上記のポーリングの中継等を行うルータ装置へのアクセス方法や、そのアドレス、またはネームについての情報も、この顧客DBに記載されていても良い。もちろん、このルータ装置そのものが家電IDを有しており、これらが顧客DBに登録をされていても良い。

【0155】（動作）

（1）家電機器に対するプログラムの供給

上述のように構成された家電制御システムにおいて、家電サーバ装置40にサービスの提供を申し込む際の動作は、例えば図17に示すように、ユーザがTV装置12を操作して、サービスの提供を申し込み、これに対する家電サーバ装置40からの確認応答に対して確認応答を送信し、さらに、ユーザが空調装置22の電源を投入するまでの処理（S81～S90）は、上述の図12中のS31～S40までと同様であるが、この後の処理が異なる。

【0156】空調装置22の電源が立ち上がると（S90）、当該空調装置22は、無線通信I/F221によってネットワーク90の設定が初期化され、例えば空調装置22にはネットワーク90内で固有のプライベートアドレスが決定される（S91）。

【0157】この後、空調装置22は、ルータ装置99宛に上述のポーリングのパケットを送信する（S92）。このパケットは、ルータ装置99によってアドレス変換等が施されて中継され（S93）、家電サーバ装置40宛てに送信される（S94）。

【0158】このようなポーリングに応じてHTTPd42aは、上述の図12中のS48～S50と同様に、空調装置22の認証、鍵の交換等の処理、空調装置22に対する遠隔制御を受けるプログラムの供給等の処理を

実行する（S95～S100）。この際、ルータ装置99によってアドレスの変換等が行われてパケットの中継が行われる（S96, S99）。

【0159】これにより、空調装置22が遠隔制御を受ける動作を実現するプログラムが、空調装置22の制御部225が備えるメモリ等に格納され、実行状態となる（S101）。

【0160】この状態で、例えば家電サーバ装置40から空調装置22宛てに遠隔制御のコマンドが供給されると、空調装置22が当該コマンドに応じて動作を制御し得る状態となる。

【0161】プログラムの提供が成功すると、DBエンジン42bは、プログラムを提供した家電機器に対応する顧客DB43a中の情報（遠隔制御可否）を「否」から「可」に変更する。

【0162】（2）サービスの利用（遠隔制御）

上述のように、家電サーバ装置40からの遠隔制御サービスを受けるためのプログラムが実行状態になると、空調装置22は、入力部222からの指示入力他に、家電サーバ装置40から指示コマンドの入力を監視する状態となる。

【0163】この家電制御システムでは、例えば図18に示すように、上述の図13中のS60からS64までの処理と同様に、携帯端末装置70の認証・鍵交換（S110）、HTTPd42aに対する家電制御ページの送信要求（S111）、家電制御ページの提供（S112）、指示入力（S113）、設定要求の送信（S114）までの処理が実行される。

【0164】この後、DBエンジン42bは、顧客DB43a中の対応テーブルから当該ユーザの空調装置22までのアクセス方法（図16中のアクセス）、アドレス等の情報を取得する。

【0165】この場合、空調装置22までの通信には、ポーリング処理が必要であるため、HTTPd42aは、空調装置22からのポーリングパケット（S120）が、ルータ装置99によってアドレス変換等されて（S121）、提供される（S122）まで待機する。ポーリングパケットが供給されると、HTTPd42aは、このパケットに対する応答として空調装置22宛ての温度設定要求をルータ装置99宛に送信する（S123）。この温度設定要求は、ルータ装置99で中継されて（S124）、空調装置22に供給される（S125）。

【0166】空調装置22の制御部225は、家電サーバ装置40から供給された温度設定要求に応じて設定温度を変更する（S126）。

【0167】（効果）この家電制御システムでは、上述のように、家電サーバ装置40から空調装置22に対して遠隔制御を行う場合に、空調装置22から家電サーバ装置40に対するポーリング（例えば30秒に1回）を

待って、このポーリングに対する応答として遠隔制御のコマンドを送信する。

【0168】これにより、この家電制御システムでは、インターネット等の外部のネットワーク側から通信を開始することができない家電機器に対しても遠隔制御等のサービスを提供することができる。

【0169】また、この家電制御システムでは、遅くとも家電機器から家電サーバ装置に対するポーリングの周期での制御コマンドの発行を行うことができるため、ポーリング周期を適宜設定することにより容易に応答性の向上に寄与することができる。

【0170】なお、上述の各実施形態においては、家電IDとして「機器固有の識別情報」を用いた場合について説明したが、世の中には、互いに独立した複数の識別情報が同時に存在し得る。例えば、EUI64の値と、IPアドレスの値と、電話番号の値と、製造番号等である。このため、家電IDとしては、例えば「EUI64の何番」、「電話番号の何番」、と言うように、「どのような属性の識別情報か」、「その識別情報の何番か」という形で定義することも可能である。

【0171】

【発明の効果】本発明では、サービスの利用を要求する家電機器（第1の家電機器）からサービスを提供する家電サーバ装置に、当該第1の家電機器の識別情報と、サービスを利用する家電機器（第2の家電機器）を示す情報を含むサービスの利用要求を送信する。このような利用要求を受信した家電サーバ装置は、識別情報保持手段を参照して受信した第1の家電機器の識別情報に対応する所有者が受信した第2の家電機器を示す情報に対応する家電機器を所有しているか否かを確認し、所有していることが確認された場合に、第2の家電機器宛てにサービス利用ソフトウェア又は当該家電機器に予め組み込まれたサービス利用ソフトウェアの起動を指示するコマンドを送信する。このような、サービス利用ソフトウェア又はコマンドを受信した第2の家電機器は、受信したサービス利用ソフトウェア又はコマンドに応じて当該サービス利用ソフトウェアを実行し、家電サーバからサービスの提供を受ける。

【0172】これにより、ユーザが所有している家電機器に応じたサービスを提供することができ、例えば家電機器の設置環境等に応じた制御プログラムを提供することができる。このため、設置環境が異なる家電機器の遠隔地からの管理を容易に実現することができる。

【図面の簡単な説明】

【図1】本発明の第1の実施形態に係る家電制御システムの構成を示すブロック図である。

【図2】前記家電制御システムを構成する家電サーバ装置の顧客DBに格納されている対応テーブルの例を示す図である。

【図3】前記家電制御システムを構成する家電サーバ装

置の家電D Bに格納されている対応テーブルの例を示す図である。

【図4】前記家電制御システムにおけるプログラムの提供処理を示すシーケンス図である。

【図5】前記家電制御システムにおける遠隔制御処理を示すシーケンス図である。

【図6】本発明の第2の実施形態に係る家電制御システムの構成を示すブロック図である。

【図7】前記家電制御システムにおいて送受信されるエコネットパケットのフォーマットを示す図である。

【図8】前記家電制御システムにおいて送受信されるTCP/IPパケットのフォーマットを示す図である。

【図9】前記家電制御システムを構成するゲートウェイ装置の構成を示すブロック図である。

【図10】前記ゲートウェイ装置を構成する対応テーブル保持部に保持される対応テーブルの例を示す図である。

【図11】前記家電制御システムを構成する家電サーバ装置の顧客DBに格納されている対応テーブルの例を示す図である。

【図12】前記家電制御システムにおけるプログラムの提供処理を示すシーケンス図である。

【図13】前記家電制御システムにおける遠隔制御処理を示すシーケンス図である。

【図14】本発明の第3の実施形態に係る家電制御システムの構成を示すブロック図である。

【図15】前記家電制御システムにおいて送受信されるTCP/IPパケットのフォーマットを示す図である。

【図16】前記家電制御システムを構成する家電サーバ装置の顧客DBに格納されている対応テーブルの例を示す図である。

【図17】前記家電制御システムにおけるプログラムの

提供処理を示すシーケンス図である。

【図18】前記家電制御システムにおける遠隔制御処理を示すシーケンス図である。

【符号の説明】

1…建物、10…第1のネットワーク（AV系）、11…有線回線、12…TV装置、121…通信I/F、122…入力部、123…受信部、124…Webブラウザ、125…表示部、126…制御部、129…家電ID保持部、13…録画装置、14…音響装置、19…ルータ装置、191…通信I/F、192…通信I/F、193…ルーティング制御部、20…第2のネットワーク（白物系）、21…無線回線、22…空調装置、221…無線通信I/F、222…入力部、223…温度センサ、224…室外機制御部、225…制御部、229…家電ID保持部、23…給湯管理装置、24…冷蔵庫、25…電子レンジ、26…洗濯機、29…ルータ装置、291…通信I/F、292…無線通信I/F、293…ルーティング制御部、30…第3のネットワーク（インターネット系）、40…家電サーバ装置、41…通信I/F、42…サービス提供部、42a…HTTPd、42b…DBエンジン、43…DB、43a…顧客DB、43b…家電DB、50…端末装置、51…通信I/F、52…入力部、53…表示部、54…Webブラウザ、60…ゲートウェイ装置、65…基地局70…携帯端末装置、71…通信I/F、72…入力部、73…表示部、74…Webブラウザ、80…ネットワーク、89…ゲートウェイ装置、891…通信I/F、892…エコネットI/F、893…プロトコル変換部、90…ネットワーク、99…ルータ装置、991…通信I/F、992…無線通信I/F、993…ルーティング制御部

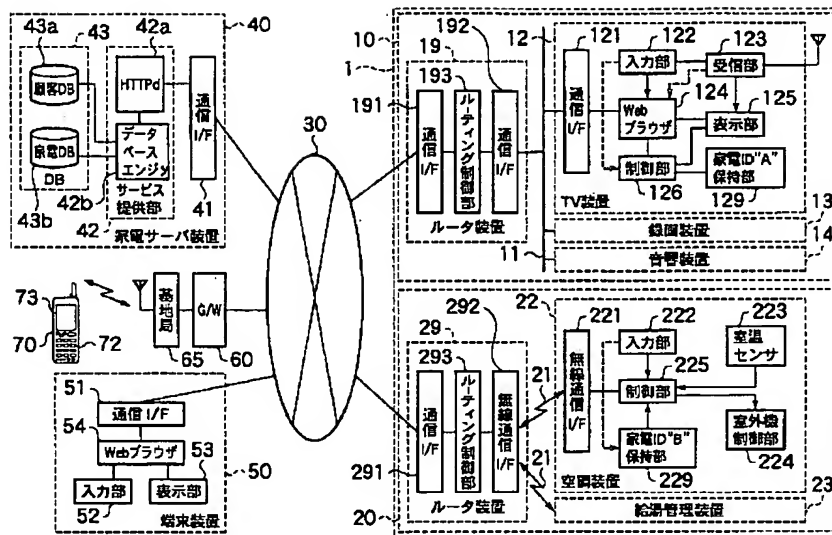
【図2】

43a

ユーザ名	ユーザ情報	所有家電の家電ID	種別・型番	製造年月日	購入履歴	メンテナンス記録	アクセス	アドレス又はネーム	遠隔制御可否
X	住所、氏名、年齢、職業、電話番号、プロバイダ、電子メールアドレス、好み、	A	TV装置 XYZ-012	...	...	...	IPv6	X	否
		B	空調装置 ABC-123	...	...	...	IPv6	Y	可
		C	ルータ装置 DEF-123	...	...	...	IPv6	V	否
		D	ルータ装置 DEF-456	...	...	...	IPv6	W	否
		...	...	...	...	...	...	...	...
Y	住所、氏名、年齢、	YA	TV装置 XYZ-013	...	...	...	IPv4	YA	可
		YB	...	...	...	...	...	...	...



【図1】



【図3】

【図8】

43b

(遠隔制御)

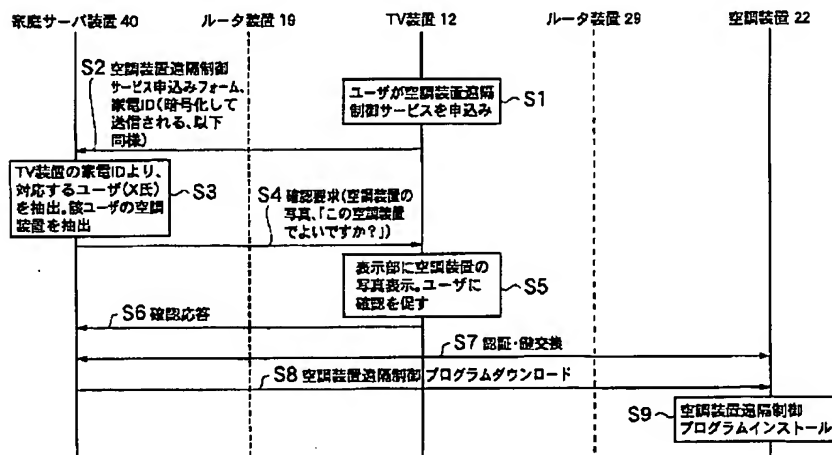
種別	型番	機能 A	機能 B	機能 C	・
TV装置	XYZ-001	○	×	×	・
	XYZ-002	○	○	×	・
	XYZ-003	○	○	○	・
	・	・	・	・	・
空調装置	ABC-123	○	×	×	・
	ABC-124	○	○	×	・
	・	・	・	・	・

ヘッダ  
(あて先IPアドレス = Z, ソースIPアドレス = W, ポート番号 = HTTP用)

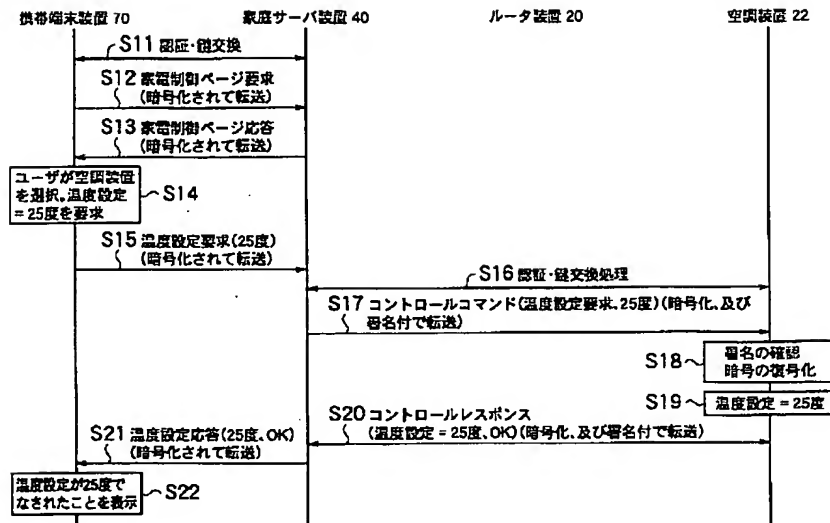
ペイロード  
POST/cgi-bin/kauden.cgi HTTP/1.1

Data = 転送パラメータ(暗号化されている): 家電ID = B, ポーリング要求

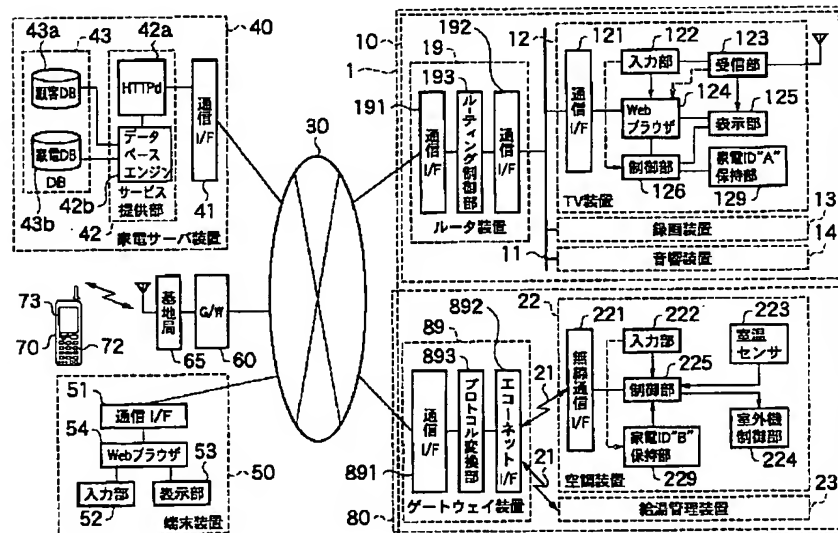
【図4】



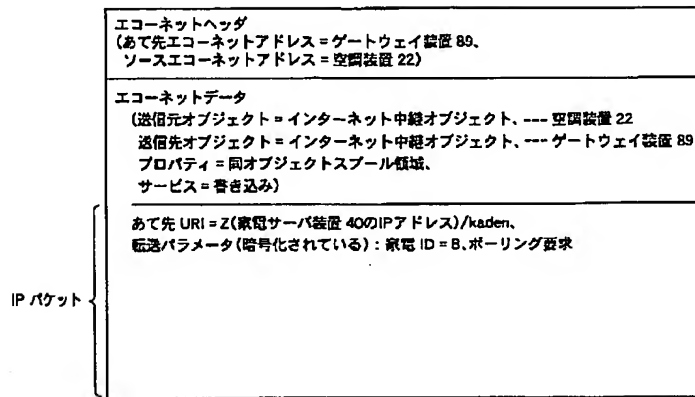
【図5】



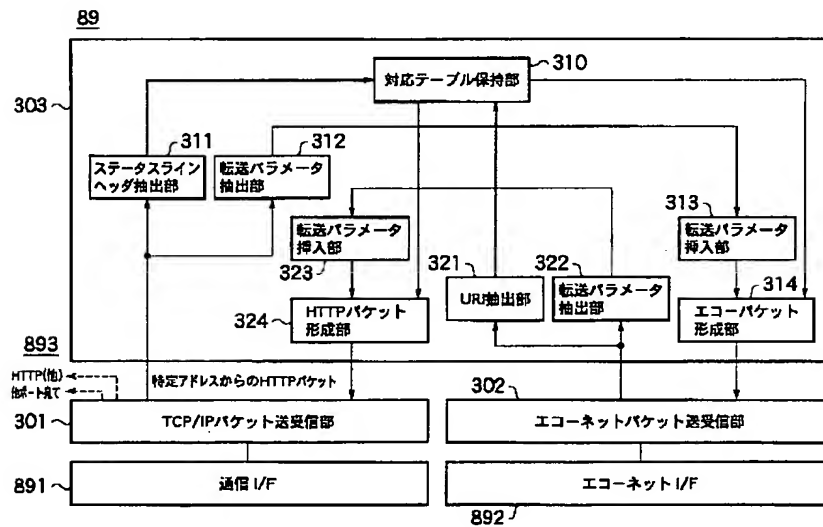
【図6】



【図7】



【図9】



【図11】

43a

ユーザ名	ユーザ情報	所有家電 の家電ID	種別・型番	アクセス	アドレス	ホームゲートウェイ へのアクセス	アドレス 又はネーム
X	住所、 氏名、 年齢、 職業、 電話番号、 プロバイダ、 電子メール アドレス、 好み、	A	TV装置 XYZ-012	IPv6	X	IPv6	V
		B	空調装置 ABC-789	機器からの ポーリング (30秒毎)	エコーネット アドレス (アドレス未定) → E1	IPv6	W
		C	ルータ装置 DEF-123	IPv6	V	—	—
		D	ホームゲートウェイ DEF-456	IPv6	W	—	—
		...	...	...	...	...	...

【図10】

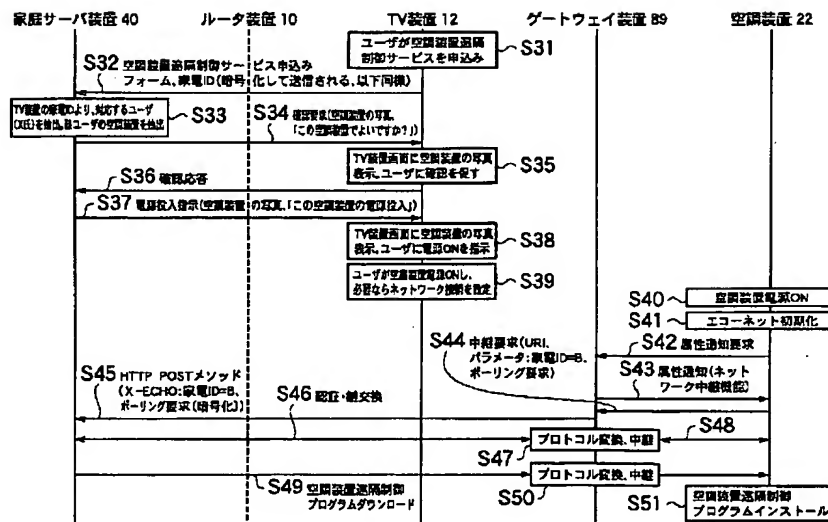
310

あて先 URI	エコネットアドレス
Z/kaden	E1 (空調装置 22のエコネットアドレス)
...	...

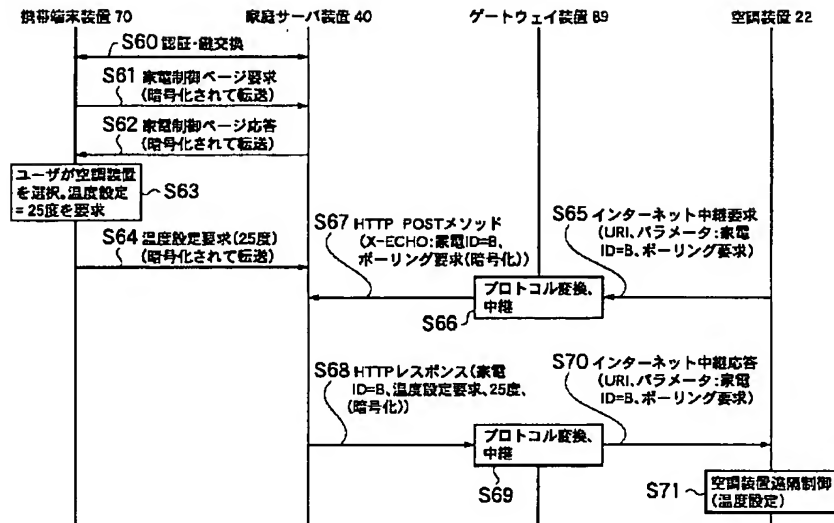
【図15】

ヘッダ (あて先IPアドレス = Z、ソースIPアドレス = Y、ポート番号 = HTTP用)
ペイロード POST/cgi-bin/kaden.cgi HTTP/1.1  Data = 転送パラメータ(暗号化されている) : 家電ID = B、ポーリング要求

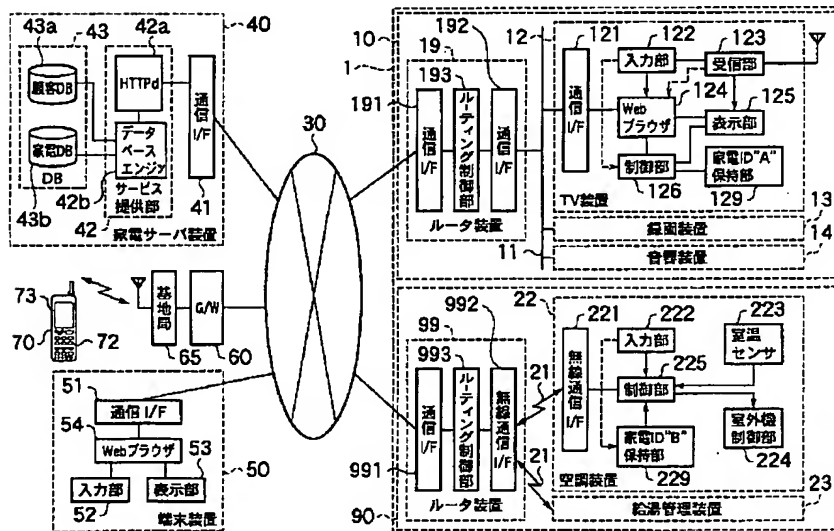
【図12】



【図13】



【図14】

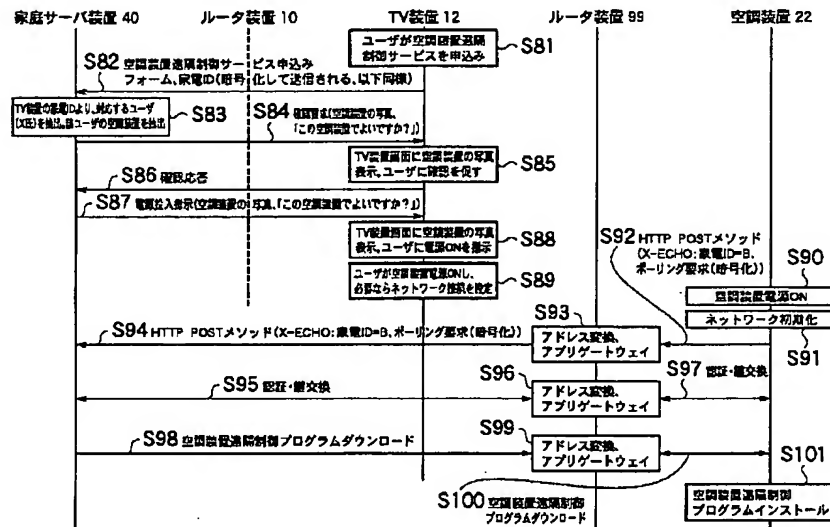


【図16】

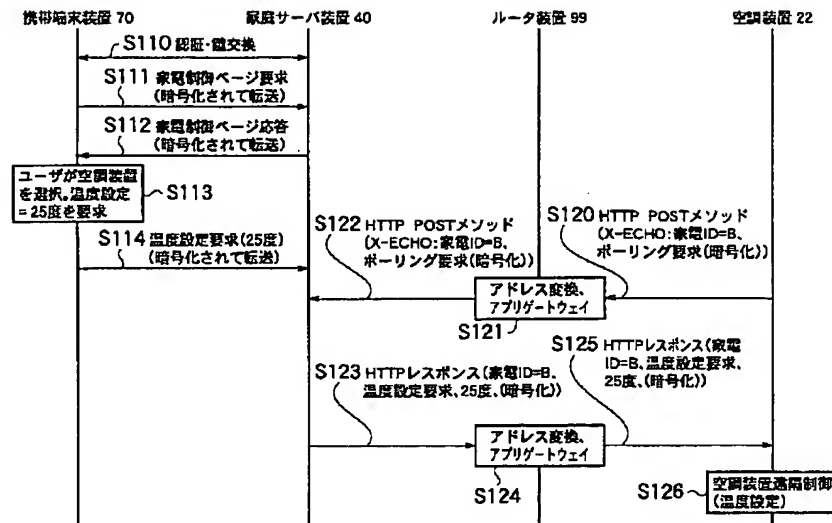
43a

ユーザ名	ユーザ情報	所有家電の家電ID	種別・型番	アクセス	アドレス	ルータ装置へのアクセス	アドレス又はネーム
X	住所、氏名、年齢、職業、電話番号、プロバイダ、電子メールアドレス、好み、	A	TV装置 XYZ-012	IPv6	X	IPv6	V
		B	空調装置 ABC-789	機器からのポーリング (30秒毎)	到達不可能	IPv6	W
		C	ルータ装置 DEF-123	IPv6	V	—	—
		D	ホームゲートウェイ DEF-456	IPv6	W	—	—
		...	...	...	...	...	...

【図17】



【図18】



フロントページの続き

(51) Int. Cl. <sup>7</sup>	識別記号	F I	テーマコード (参考)
H 0 4 M 11/00	3 0 1	H 0 4 M 11/00	3 0 1

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 Fターム(参考) 5B085 BE07 BG02 CA01 CA06  
 5B089 GA11 GA23 GA31 GB01 GB04  
 HB05 HB10 JA34 JA35 JB07  
 JB10 KA13 KB06 KF05  
 5K048 BA02 BA12 DC07 EA14 EB01  
 EB02 FB10 FC01 HA01 HA02  
 5K101 KK11 LL01